Department for
Business, Energy
& Industrial Strategy

DRIVERS OF FIRM RELOCATION

Final report

BEIS Research Paper Number 2019/002

May 2018

Contents

1. Executive summary

Based on an extensive literature review, 40 in-depth interviews and econometric analysis of the Inter-Departmental Business Register, this research report explores the drivers of firm relocation in the modern UK economy. We find that several factors, from the availability of labour and access to transport, to the perception of an area and quality of life, affect relocation decisions.

Economic Insight was commissioned by the Department for Business, Energy and Industrial Strategy (BEIS) to undertake this research project. The overarching objective was to update and extend the existing evidence base in relation to why firms of different types choose to relocate some or all of their business functions.

As detailed in this paper, we have undertaken three key forms of research. Specifically:

- **Literature review**. We have reviewed 32 papers in detail, covering both academic and 'grey' literature. Using this evidence base, we have developed a conceptual framework which provides a definition of 'relocation', details the different theories of the relocation decision-making process, and identifies a list of potential drivers of firm behaviour. We have also detailed the empirical findings from the literature in terms of what factors have previously been found to be significant drivers of relocation behaviour.

- **In-depth interviews**. We have conducted in-depth telephone interviews with: 32 firms that relocated within the last five years; and 8 other stakeholders that have a perspective on firm relocation behaviour (trade bodies, real estate services firms, head hunters and academics). In addition,10 case studies have been developed from the firms we interviewed.

- **Econometric analysis**. We have conducted econometric analysis of the Inter-Departmental Business Register (IDBR) to empirically test what drives firms to move an individual 'local unit' from its current location. Location characteristic data was matched in, so both firm- and location-specific factors could be analysed.

Our work covers all types of relocation, although we have focused on: relocations within the UK; by firms with 50 or more employees; in sectors covering manufacturing, professional services, and technology. The extent to which our research is relevant to different types of relocation varies. Particularly in relation to international relocations: our conceptual framework, and the 'long-list' of factors within it, is applicable to international relocations; whereas our interviews and econometric analysis relates specifically to relocations within the UK, and it can reasonably be expected that the relative importance of drivers will be different for international relocations.

In the rest of this executive summary, we provide details of our main research findings and present ideas for future research.

Main research findings

The definition of firm relocation includes both 'movements' and 'expansions', and in theory, relocations can be driven by a multitude of factors.

Firm relocation can broadly be defined as the adjustment of a firm's spatial distribution (Brouwer et al., 2004). It includes complete relocations, e.g. where a single-site firm moves from one location to another; and partial relocations, e.g. where a multi-site firm moves an individual production unit or establishes a new branch.

Relocations can be further categorised in terms of the distance over which a movement or expansion takes place, and the extent to which assets are transferred from one location to another.

To analyse firm relocations, the decision-making process can be broken down into two stages: the decision whether to relocate; and dependent on that, the decision of where to relocate to (Pellenbarg et al., 2002). We use this distinction throughout our work, but note that some firms will combine these stages, and only move if there is a suitable alternative.

There are three broad theories of firm relocation (Hayter, 1997; Pellenbarg et al., 2002): Neo-classical; Behavioural; and Institutional. Neo-classical theory assumes that firms are profit maximising, have full information, and engage in rational behaviour. Behavioural theory relaxes the strict assumptions of the neo-classical theory, and suggests that firms may make 'sub-optimal' choices through the use of heuristics and because personal preferences can influence decisions. Institutional theory suggests that firms do not necessarily operate in 'static' environments, and can, for example, negotiate with institutions (such as suppliers and local governments) in relation to factors that will affect their profitability at a particular location. The behavioural and institutional theories are extensions of the neo-classical theory, and are themselves not mutually exclusive, i.e. they can occur simultaneously. The results of our interviews suggest that all three theories help explain firm behaviour.

Based on the theories, we have developed a 'long-list' of potential drivers of firm relocation, within five groups:

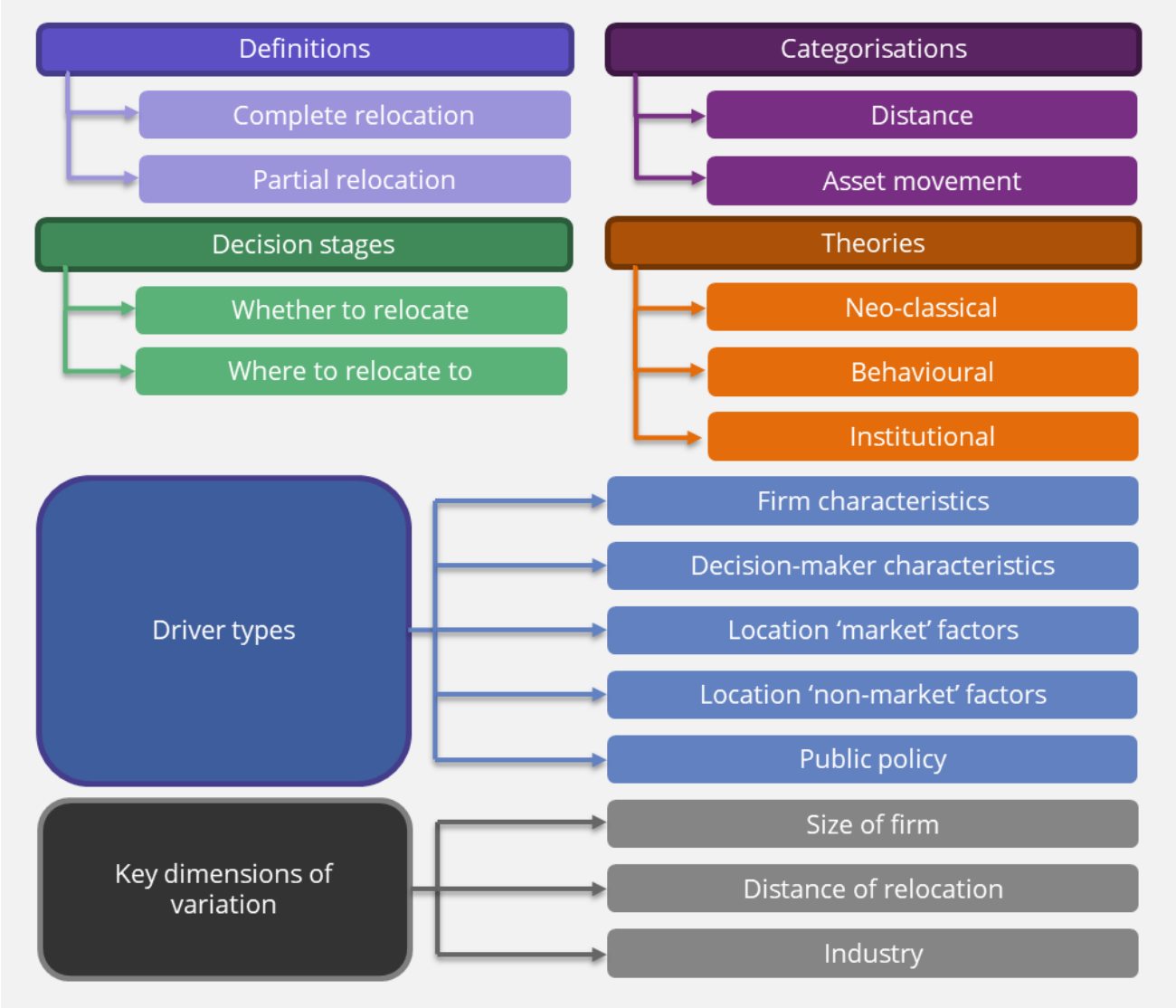
- **Firm characteristics**, such as size, industry and planned growth / contraction.
- **Decision-maker characteristics**, such as personal preferences and knowledge.
- **Location 'market' factors**, such as local wage rates and access to transport.

- **Location 'non-market' factors**, such as the availability of amenities and quality of housing.
- **Public policy**, such as the provision of public services and subsidies/taxes.

Some of the identified drivers may also be closely related to each other. For example, public policy may affect both location 'market' and 'non-market' factors. It can also be reasonably expected that the drivers of firm relocation will vary across different firm characteristics, such as size, industry, and distance of relocation. We explore these differences throughout our work.

The conceptual framework that we have developed, which incorporates the definition of firm relocation and potential drivers, is summarised in Figure 1 below.

Figure 1: Overview of conceptual framework



Source: Economic Insight

The propensity of firms to relocate is relatively low. Most relocations are 'local', and are undertaken by smaller firms in sectors that require fewer fixed assets.

Within our population of interest, our analysis of the IDBR suggests that over the period 2007-2017, 0.47% of 'local units' (1,087 out of 233,561) relocated between Travel to Work Areas (TTWAs) each year.[1] This finding is broadly consistent with academic research from other countries (e.g. Brouwer et al., 2004).

When relocations do take place, they are more likely to take place between locations that are closer to each other. As Figure 2 below shows, the number of inter-region relocations is greater between regions that are geographically close to each other.

Figure 2: Relocation flows between regions 2007-2017 (number of local units relocating from origin to destination region)

		Destination												
		North East	North West	Yorkshire and The Humber	East Midlands	West Midlands	East Anglia	East of England	London	South East	South West	Wales	Scotland	Northern Ireland
Origin	North East	-	3	5	0	0	0	0	3	1	1	1	1	0
	North West	5	-	7	5	6	1	2	8	2	3	5	2	1
	Yorkshire and The Humber	5	2	-	11	5	1	2	6	3	0	1	3	0
	East Midlands	2	7	4	-	15	2	3	6	2	4	0	0	0
	West Midlands	1	8	1	12	-	1	3	8	6	2	1	2	0
	East Anglia	0	0	1	3	0	-	6	3	3	2	0	0	0
	East of England	1	3	4	4	1	6	-	30	11	3	0	0	0
	London	3	13	3	4	7	5	45	-	79	6	1	1	0
	South East	1	7	2	3	6	4	14	71	-	7	2	0	1
	South West	1	4	2	0	6	0	2	3	12	-	3	0	0
	Wales	2	2	0	0	2	0	1	3	5	1	-	0	0
	Scotland	0	1	0	1	0	1	0	3	2	1	0	-	0
	Northern Ireland	0	1	0	0	0	0	0	0	1	0	0	0	-

Furthermore, we find that firms are more likely to relocate if they are smaller, younger, and operate in sectors that require fewer fixed assets (i.e. service-based industries, rather than manufacturing).

[1] A local unit is single site, such as a factory or office. Our population of interest for the analysis of the IDBR included only local units with 50 or more employees in sectors considered as manufacturing, professional services and technology.

Firms most often relocate for 'internal' reasons (such as expansion), but local 'push factors' also play a role.

Academic literature has concluded that the primary reason firms relocate is to allow for expansion, whereas cost savings and government policy are secondary drivers (Brouwer et al., 2004; Pellenbarg et al., 2002; Hayter, 1997; Chan et al., 1995). Consistent with this, the main reason that 47% of the firms we interviewed relocated was due to expansion – including both 'achieved' and 'expected' increases in commercial activity.[2]

However, firms that we interviewed often gave multiple reasons for why they chose to move from their current location. Other 'internal' factors, such as proximity to customers, accessibility for staff, the condition of the current property and lease conditions were sometimes given as contributing factors. Furthermore, it was common for very local and site-specific reasons, such as the availability of parking, to be highlighted as 'push' factors.

Our econometric analysis also suggests that a range of variables affect relocation decisions, such as industry, the age of a local unit, the number of staff it employs, and Gross Value Added (GVA) per head in the local authority district. Whereas, factors including regional commercial property prices were not found to be significant drivers in the models.

Overall, our models only explain a small proportion of firm behaviour, which is consistent with 'internal' factors that weren't included in the models due to data limitations (such as expansion plans) driving much of the decision to relocate.

When firms do relocate, they have to exercise a degree of commercial judgement in choosing where to move to. Some firms, particularly smaller ones, make location choices based on personal preferences of key decision makers.

Through the interviews with firms and other stakeholders, it was clear that there is often no 'clear' best location, and the management of firms have to exercise a degree of commercial judgement.

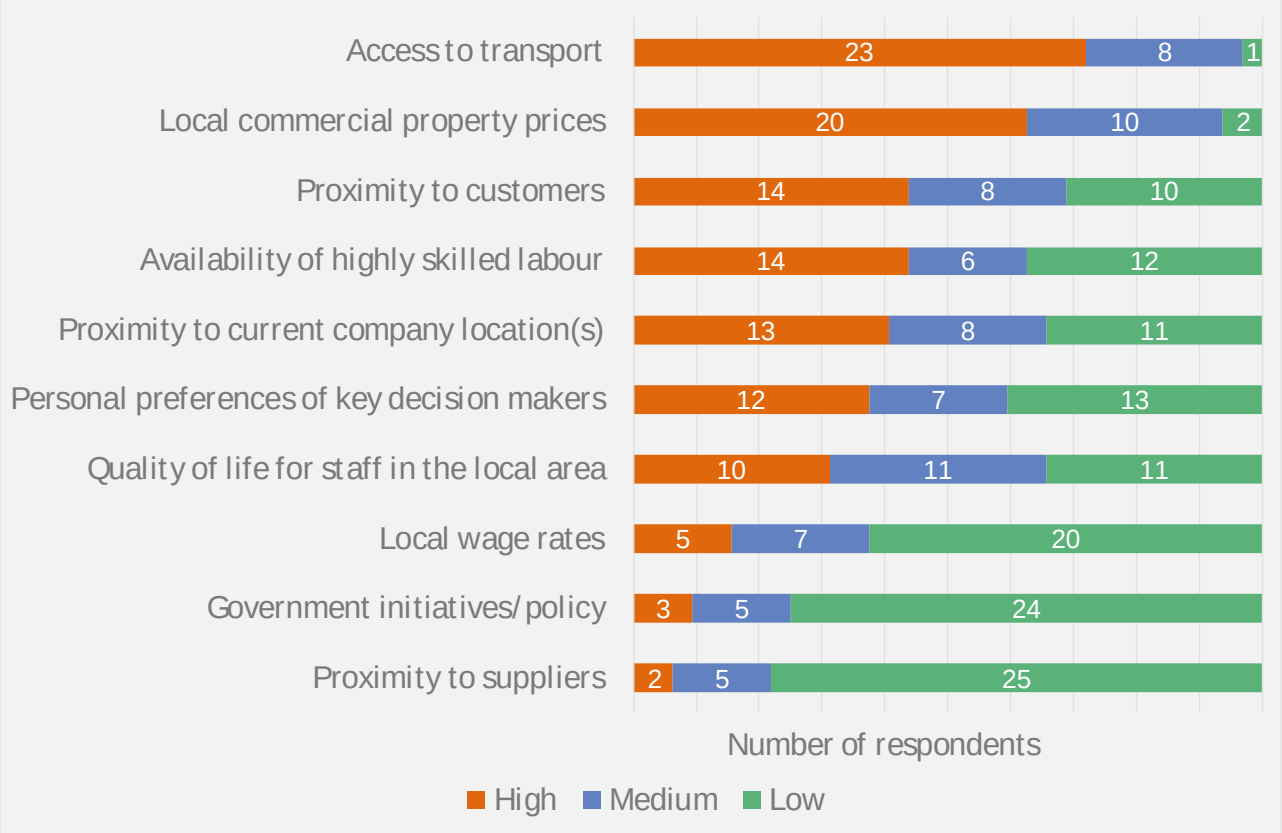
We found that larger organisations were more likely to undertake a systematic decision-making process, and make more 'objective' choices. Smaller firms were more likely to relocate based on individuals' personal preferences, such as where an owner lives. This is consistent with academic research, including recent UK-specific evidence (Greenhalgh, 2008).

[2] Although the sample for our firm interviews is not statistically representative of the general population of firms, it nevertheless provides indicative evidence.

Overall, evidence from the interviews suggests that firms place greatest importance on access to transport. However, the importance of factors varies depending on the characteristics of the firm.

As is shown in Figure 3 below, overall the interviews suggest that access to transport is the most important factor in the choice of location. It was important for most firms in terms of staff getting to and from work; important for many firms for customer access; and important for some manufacturing companies to transport their products. The importance of national versus local transport infrastructure depended on the geographic market served.

Figure 3: Relative importance of factors among the firms we interviewed



Notably:

- Proximity to customers was a factor identified by many as of high importance to the choice of location. Being able to visit, and be visited by, customers was highly valued by firms from all sectors.
- For firms that were relocating production units, proximity to the original site was important for retaining staff, and staff retention was likely to be more important for companies that require staff to have a high degree of job-specific human capital.
- Whilst a proportion of the firms considered the overall quality of life for staff in different areas, the focus was on the amenities in the immediate locality (such as shops,

restaurants, and cultural centres). This included both small and large firms, and those relocating over short and long distances. 'Softer' factors were more commonly mentioned by firms requiring highly skilled labour e.g. professional services firms.

- On the whole, companies did not report being affected by public policy. Furthermore, they did not generally appear to be aware of the support available to them from public sector organisations, or the policies designed to help them. However, it could be that firm behaviour is affected by targeted policies, but there is a lack of awareness among companies about how policies affect the drivers that matter to them.

In addition to the factors we explicitly asked each firm interviewee about (as per Figure 3), two other important drivers arose.

- The reputation of an area was identified as a key factor for some firms – in particular, those that were frequently visited by clients and customers. Multinational companies appeared to favour having a presence in London, or another 'world-renowned' UK city.
- Some firms – typically larger or more specialised ones – noted the importance of being in an industry cluster. Access to labour was the reason given for its importance.

Table 1 below details the key variations in the importance of drivers that we have been able to identify from the interviews.

Table 1: Variation in driver of location choice by firm characteristics

Firm characteristic	Relative importance of drivers of location choice
Size	• Personal preferences of key decision makers more important for smaller companies (e.g. location of owner's house). • Proximity to original location more important for smaller, single-site firms (in order to maximise staff retention).
Industry	• Quality of life (particularly availability of local amenities and cultural hub) and reputation of an area more important for professional services than manufacturing firms. • Transport for haulage purposes more important for manufacturing firms (but transport important for all industries).

Firm characteristic	Relative importance of drivers of location choice
Job-specific human capital	• Proximity to origin location more important for firms that employ staff with a large degree of job-specific human capital[3] (in order to maximise staff retention).
Geographic market served	• National transport infrastructure more important for firms that serve national or international markets.
Foreign or domestic ownership	• No clear differences were found between foreign and domestically owned companies.

Future research

Following on from the research we have conducted, we identify three main areas for potential future research in the final chapter of our report.

- **Further analysis of the IDBR**. Further analyses that could be conducted in relation to firm relocation using the IDBR includes: enterprise level analysis; more localised analysis; targeted analysis of identified relocations; and analysis of additional financial-related independent variables.
- **Use of ongoing surveys to collect new types of data**. A number of ongoing business surveys, which use the IDBR as a sample frame, could be used to collect new types of information from firms in relation to relocation decisions.
- **International relocations**. Further research could be conducted that focuses on international relocations – both in terms of firms with a UK presence choosing to relocate abroad, and foreign firms choosing to relocate to the UK.

Structure of document

The remainder of this document is structured as follows.

- Chapter 2: background and context;
- Chapter 3: conceptual framework;

[3] Job-specific human capital consists of skills and knowledge that are specific to a role within a firm, and that aren't widely available in the labour market. Job-specific human capital is generally developed through on-the-job training.

- Chapter 4: existing empirical evidence;
- Chapter 5: evidence from interviews;
- Chapter 6: analysis of the IDBR;
- Chapter 7: ideas for future research;
- Appendix A: literature review; and
- Appendix B: analysis of IDBR.

2. Background and context

The government is committed to creating an economy that boosts productivity and earning power throughout the UK, as is set out in its industrial strategy. One of the five foundations of the strategy is 'places', and the government will be agreeing local industrial strategies that build on local strengths and deliver on economic opportunities. To ensure all potential policy levers are considered, and to ensure that policies are effective, research is required on why firms choose to relocate, how decisions to relocate to a particular location are made, and the factors influencing the locational choice. However, much of the existing UK-specific research is outdated, and empirical research from other countries may not be relevant to the UK.

In the above context, BEIS commissioned Economic Insight to update and extend the evidence base. More specifically, the objectives of this research are:

- To update the evidence base on why some firms choose to relocate all their business or some functions, and what drives their locational choice in a modern economy.
- To extend the existing research to cover more sectors of the economy, reflecting changes in the sectoral composition of the economy since the 1970s.
- To compare the drivers of relocation between different types of companies (for instance by business size, sector, and ownership).
- To review the evidence on attractiveness of different UK locations, and the UK more generally.

Furthermore, at the initial stage of the project it was decided that there should be a focus on medium to large businesses in the manufacturing, professional services and technology sectors relocating within the UK. Some of our research is also applicable to movements into and away from the UK.

To meet these objectives, and as is detailed in this report, we have:

  - undertaken a literature review and developed a conceptual framework;
  - conducted 32 interviews with firms that have relocated, and 8 interviews with other organisations/individuals (trade bodies, real estate services firms, head hunters, and academics);
  - developed 10 case studies; and
  - conducted econometric analysis of the IDBR.

3. Conceptual framework

This chapter of our report sets out a conceptual framework for analysing firm relocation decisions. It provides a definition of 'relocation', details the different theories of the relocation decision-making process, and identifies a list of potential drivers of firm behaviour.

In summary:

- Firm relocation can broadly be defined as the adjustment of a firm's spatial distribution. It can include **complete relocation**, e.g. where a single-site firm moves from one location to another, and **partial relocation**, e.g. a multi-site firm establishing a new branch (Brouwer et al., 2004).

- Relocations can be categorised in terms of: **distance**, such as intra-regional, inter-regional, and international; and the extent to which **assets are relocated**, such as moving all machinery and employees, or the procurement of new physical assets and employment of additional individuals.

- A relocation decision can be broken down into two stages: the **decision whether to relocate**; and dependent on that, the **decision of where to relocate to** (Pellenbarg et al., 2002). Alternatively, some firms will only move if there is a suitable alternative, and the two stages are combined into one decision of relocating to a particular area.

- There are three broad theories of firm relocation (Hayter, 1997; Pellenbarg et al., 2002). **Neo-classical theory** assumes that firms are profit maximising, have full information, and engage in rational behaviour. **Behavioural theory** relaxes the strict assumptions of the neo-classical theory. It suggests that firms may not have full information and may not be able to fully utilise the information that they do have – instead, relying on heuristics as a more efficient approach to relocation decision-making. Behavioural theory also suggests that the personal preferences of key individuals may influence decisions, and lead to relocations that would not be considered optimal under neo-classical theory. **Institutional theory** suggests that firms do not necessarily operate in 'static' environments, and can, for example, negotiate with institutions (such as suppliers and local governments) in relation to factors that will affect their profitability at a particular location. The behavioural and institutional theories are extensions of the neo-classical theory, and are themselves not mutually exclusive.

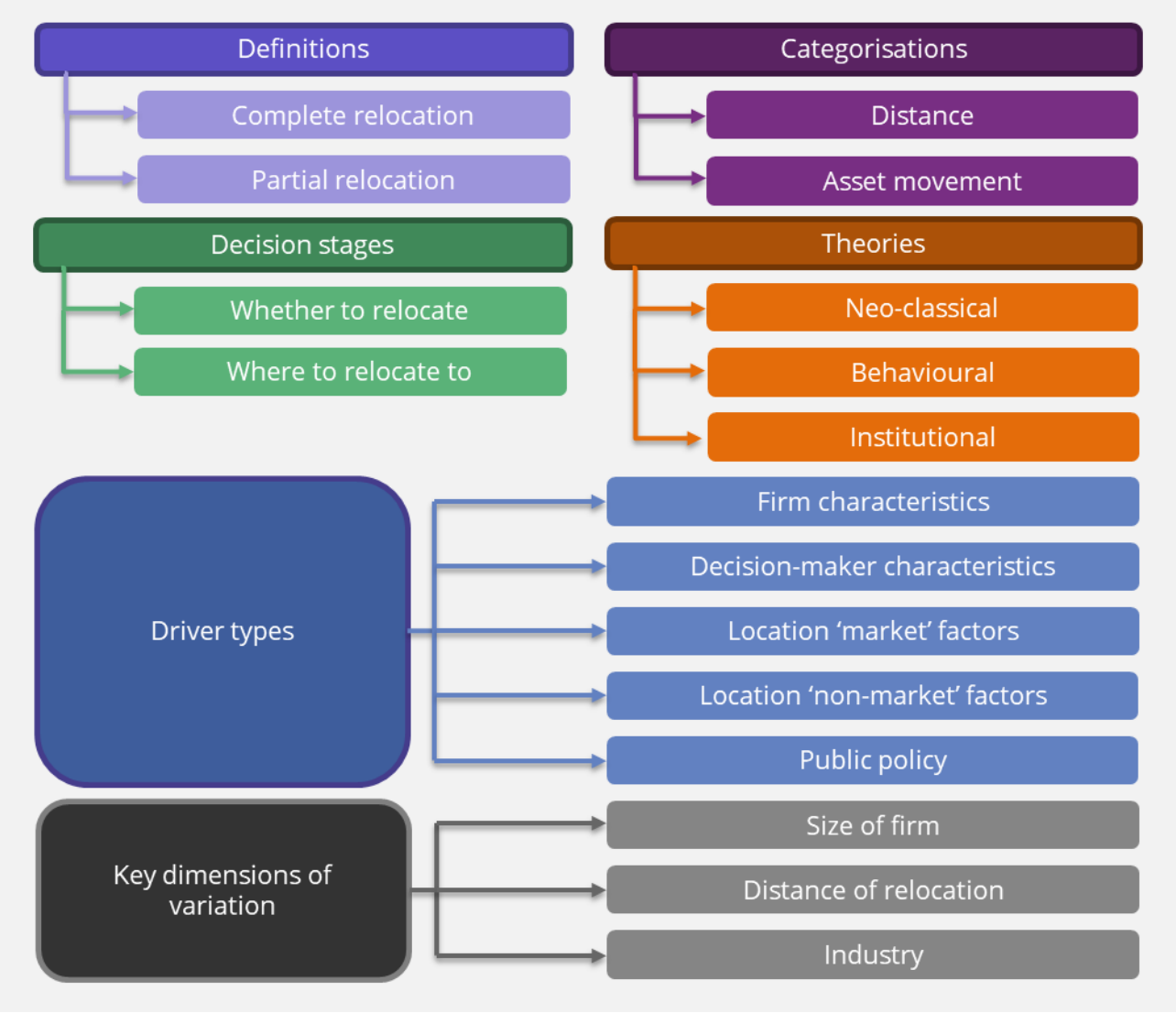
- We have developed a 'long-list' of potential drivers of firm relocation, within five groups: **firm characteristics**, such as size, industry and planned growth / contraction; **decision-maker characteristics**, such as personal preferences and knowledge; **location 'market' factors**, such as local wage rates and access to transport; **location 'non-market' factors**, such as the availability of amenities and quality of housing; and

public policy, such as the provision of public services and subsidies/taxes. Some of the identified drivers may also be closely related to each other. For example, public policy may affect both location 'market' and 'non-market' factors. In addition to the drivers discussed, it can be expected that factors such as the cost of physically moving assets and the general health of the economy will affect relocation decisions, but we do not study them in detail here.

- It can reasonably be expected that the **drivers of firm relocation will vary** across different firm sizes, industries, and distances of relocation.

Our framework is summarised in Figure 4 below, and detailed in the remaining sections of this chapter.

Figure 4: Overview of conceptual framework



Source: Economic Insight

Definition of firm relocation

The simplest form of firm relocation consists of single-site firm moving its operations from one physical location to another. However, many firms operate multiple sites, and the movement of one production site to another location can also be considered within the definition of firm relocation. Brouwer et al. (2004) makes the distinction between:

- **complete relocation**, whereby a firm in its entirety moves from one location to another; and
- **partial relocation**, whereby a firm establishes a new business site, whilst also retaining at least one existing business sites.

Partial relocation can therefore include, for example, both: a multi-site firm moving one of its production sites (e.g. moving existing staff and machinery); and a multi-site firm establishing an entirely new production site (e.g. expanding operations by acquiring an additional site). Relocation can therefore be thought of as the adjustment of a firm's spatial distribution.

Further types and categorisations of firm relocation can also be specified, which may be of differing interest from a policy perspective. In particular:

- **Distance of relocation**. A firm could relocate, for example, from one office to another office on the other side of the road. Alternatively, it could relocate from its current location to an entirely different country. These extreme examples are likely to have very different economic effects, and be interesting to policy makers for different reasons. Persillet and Shonkwiler (2013), for example, identifies three spatial categories: intra-regional; inter-regional; and international.

- **Relocation of assets**. A relocation can take place in which all factors of production (e.g. machinery and employees) are moved from one location to another. Alternatively, a relocation could take place in which no assets are moved – for example, the setting up of a new office, with entirely new staff, or the purchase of an existing factory. In addition to tangible assets, the 'movement' of intangible assets may also be relevant, as this could affect both capital stocks and productivity.

It is also worthwhile distinguishing between 'relocation' and 'location'. As discussed by Pellenbarg et al. (2002), a relocation decision could be conceptualised as two sequential steps: first the decision to move; and second, conditional upon a decision to move, the decision to relocate to another location. Location theory focuses on the optimal locational choice, which is about the attractiveness of 'destination' locations. Relocation theory also takes into account the first step – the decision to move from the current location. For some firms, this characterisation of a two-step process may be appropriate e.g. where a company decides to relocate to enable expansion. For others, the decision to relocate or not may be dependent on the alternatives available, and therefore the two-step approach would not be suitable (as the decision about whether to relocate and where to relocate to is made simultaneously).

The definition and analysis of firm relocation is also somewhat dependent on the definition of a firm. For example, a conglomerate could be considered as a single firm, or its individual subsidiaries could be considered as separate firms.

As is discussed above, the definition of firm relocation is broad, and the implications of different types of firm relocation are likely to vary. The literature that we have reviewed, and the new research that we have conducted, deals with this breadth by focusing on specific types of relocations and firms in a modern economy.

Theory of relocation decision-making

As summarised in Table 2 below, there are three broad theories of the firm relocation decision-making process: neo-classical; behavioural; and institutional (Hayter, 1997; Pellenbarg et al. 2002).

Table 2: Theories of relocation

	Neo classical	Behavioural	Institutional
Assumptions	• Profit maximising • Rational • Full information	• Bounded rationality • Limited information • Heuristics	• Non-static institutions • Negotiations • Embeddedness
Drivers	• Costs • Proximity • Growth	• Individual preferences • Management experience	• Firm size • Firm age

The behavioural and institutional theories are extensions to the neo-classical model, and are themselves not mutually exclusive. For example, in seeking to maximise profit, a firm may both utilise heuristics and engage in negotiations with local institutions. As such, a combination of theories may best explain actual firm behaviour.

We discuss each theory in detail below.

Neo-classical theory

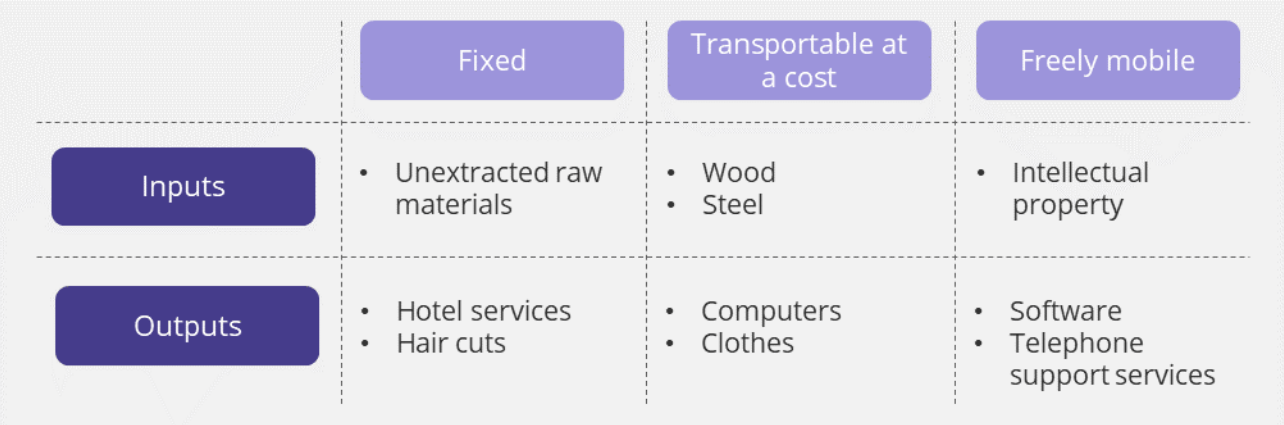
Based on classical economic theory, the neo-classical model assumes that firms are profit maximising, have full information, and engage in rational behaviour. Within this setting, the optimal location of a firm is dependent on supply and demand factors. Or, put another

way, factors that affect the cost of production and the achievable output price. Along with different locations having inherently different characteristics (e.g. local labour and property markets, different tax regimes), relocation theory takes into consideration the fact that many firm inputs and outputs are transportable. In the sections below, we first set out the relevance of mobility, then consider the special cases of the inputs of the location itself and labour, and finally discuss the optimal relocation choice.

Mobility of inputs and outputs

In general, inputs and outputs can be thought of as being on a spectrum from geographically fixed to freely mobile (without cost). Between these two extremes, transportation is possible but costly. For example: unextracted raw materials, are a geographically fixed input; materials such as wood and steel are transportable at a cost; and software can be considered a freely mobile output. Further examples are provided in Figure 5 below.

Figure 5: Examples of the mobility of firm inputs and outputs



Source: Economic Insight

The mobility of inputs and outputs will affect a firm's choice of location in the following ways.

- Fixed inputs and outputs are likely to largely determine where a business is located. For example, mines have to be located where unextracted raw materials are, and hospitality businesses such as hotels and restaurants need to be located close to where their customers will be. Outputs that are geographically fixed can be referred to as non-tradable goods. Firms that either use fixed inputs, or produce fixed outputs may have a choice between different sites, and would then be expected to make a location decision based on the transportable inputs/outputs (discussed below), achievable output prices (e.g. the market price for a night in a hotel in different cities), and the relative cost of sites themselves (discussed in the next section).

- Inputs and outputs that are transportable at a cost will, all else equal, induce the firm to locate closer to the factor that is costlier to transport. O'Sullivan (2005) defines resource-orientated and market-orientated firms. A resource-orientated firm has a

relatively high cost for transporting its inputs, and therefore locates close to the input sources. For example, for a sawmill, the weight and therefore cost of transporting its input is likely to be greater than for its output. A market-orientated firm, on the other hand, has a relatively high cost of transporting its output and will therefore locate closer to its output market. Higher output transport costs could be because the output is heavier, bulkier, or more perishable than its input. For example, for a bakery, the cost of transporting inputs (e.g. flour) is likely to be less than that for its output (fresh bread).

- Input and output factors that are freely transported will not directly affect the location choice of a firm. Rather, the absence of geographic price dimension will mean that other input/output factors will influence location.

Cost of the location itself

In addition to the effect of location on the cost of transporting mobile inputs and outputs, the location itself has profit implications. In particular, this includes:

- **Property costs**. Locational choices come with a direct cost in terms of rental or property purchase prices.
- **Taxes and subsidies**. Locations also often have associated taxes and subsidies, such as business rates and enterprise zones.

Labour and location

Labour is a critical input for all firms, but has not yet been explicitly incorporated within our neo-classical model. Labour can be considered as a special input because it is transportable, but only to a certain extent. For example, an employee is assumed to require a greater wage the further away the firm is from where the employee lives – however past a certain distance, an employee will not be willing or able to travel, irrespective of wage. This generates local labour markets.

The wage and skills mix of local labour markets can vary. As such, the choice of location can affect profitability not just through the price of labour, but also its availability. The characteristics of local labour markets are likely to vary for a variety of reasons, including:

  - job opportunities;
  - higher education institutions;
  - local amenities; and
  - natural characteristics.

Optimal locations and relocations

The above theory determines what the optimal location for a firm is in a static sense. As both the firm and the environment change over time, the static optimal location is likely to also change. Hence, the decision to relocate can be thought of as being triggered by:

- **internal factors**, such as firm expansion or contraction, the desire to enter new markets, or the expiry of a lease; and/or
- **external factors**, such as changes in locational characteristics or supply chains.

Due to relocation costs though, firms may not always relocate to the static optimal location. Indeed, the dynamic optimal location at any given point in time may well be different from the static optimal location. Relocation costs may be direct costs of moving (such as removal company fees), as well as search costs for new premises and staff – although in a simple neo-classical model some of these costs can be disregarded due to the assumption of full information.

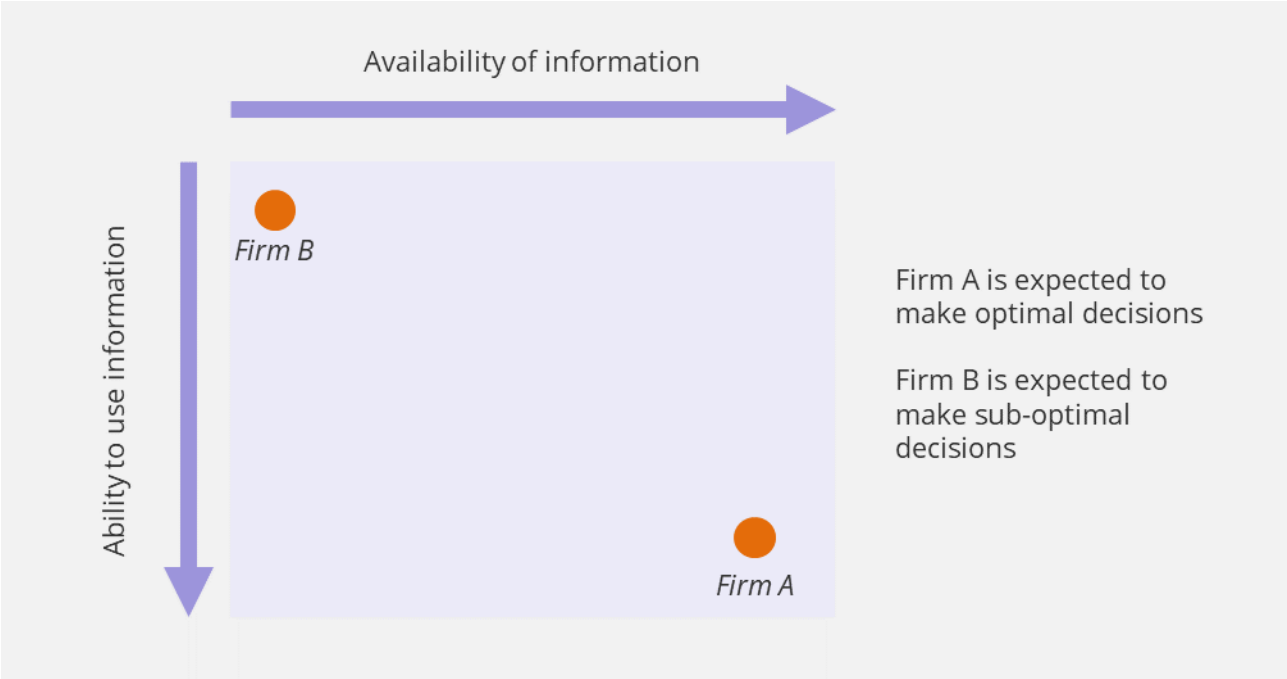
A further typical extension to a neo-classical model is to include uncertainty. In relation to firm relocation, this could be, for example, uncertainty with regard to input prices, consumer demand and government policy. The dynamic optimal location therefore becomes a factor of expectations. For example, a firm may relocate partly because it expects its destination to become a cluster for its particular industry. A model including expectations may be more challenging to test empirically because expectations are not directly observed – although could be asked about in a survey.

Behavioural theory

The behavioural model relaxes the strict assumptions of the neo-classical model and instead is based on the notions of limited information and bounded rationality. Rather than modelling the firm as 'homo economicus', it is modelled as 'behavioural man'.

Pred (1967, 1969) defines a 'behavioural matrix' in which firms can be classified across two dimensions: the availability of information; and the ability to use information – as is illustrated in Figure 6 below. Firms with 'high' access to information and a 'high' ability to use it can be expected to make relocation decisions close to the dynamic optimal in the neo-classical model. Firms with 'low' access and 'low' ability are expected to make sub-optimal location decisions.

Figure 6: Pred's behavioural matrix



Source: Economic Insight

It could reasonably be expected that the availability of information and ability to use information is correlated with the age, size and managerial experience of a firm.

For those firms that aren't in a position to make the 'rational' choice, the concept of mental maps, from behavioural geography, can be used as a framework for considering how relocation decisions are made. Here, it is the perception of locations that matter, rather than the reality of locations. Pellenbarg et al. (2002) suggests within a decision-maker's mental map, closer locations are better known. This means that firms are more likely to relocate to locations that are closer, because some of those that are further away are simply unknown, and others are less well known and therefore considered riskier. For a firm that is considering moving to a different city within the UK, the notion that distance is the determinant of knowledge may be somewhat simplistic – but the overall concept that firms are more likely to move to locations that they are more familiar with is less contentious.

The implications of limited information and limited ability to process information may mean that firms rely on heuristics to make location decisions. For example, theses could include choosing a particular location because:

- it is perceived to have a prestigious university and a high quality labour market for graduates;
- it is relatively prosperous, and therefore the firm could flourish there as well; and

– other similar firms are located there, and therefore it is assumed it would be a good location for the firm in question as well (herd behaviour).

The reasons underlying the above may well be sound economic reasons to move to a particular location, but a heuristic is a generalised rule-of-thumb, and may not reflect the optimal decision for each firm.

A further implication of the behavioural model, consistent with the more general behavioural theory of the firm (Cyert and March, 1963), is that the goals and preferences of specific individuals may determine relocation choices – and this may not be consistent with the neo-classical optimum. For example, a decision-maker may choose a location that is closer to where they live, to make their own commute easier, but that happens to be at the expense of firm profits.

Scherer and Derungs (2008) presents the concept of 'emerging strategy process', in which managers and owners of companies do not make relocation decisions in the linear-sequential way that homo economicus could be expected to do.[4] Instead, the decision process evolves as it is undertaken, and is characterised by a complex interplay of rational and emotional factors. Rational factors include those that would be incorporated in a neo-classical model, whereas emotional factors include personal motives, herd behaviour, the distribution of power within the firm, management experience, lobbying of external actors and subjective perceptions.

Institutional theory

The neo-classical and behavioural approaches assume that firms can choose a location from a static environment – that is, the characteristics of locations are predetermined. The institutional approach, on the other hand, sees firms as an integral part of local institutions. In particular, the 'geography of enterprise' theory (Krumme, 1969), views relocation decisions as the outcome of negotiations between the firm and other institutions. This could include negotiations with suppliers, labour unions, and local and national governments, about prices, wages, taxes, and planning permission.

This view of firm relocation may be more suited to assessing the relocation choices of larger firms, as they are more likely to have negotiating power – arising from their sizable potential impact on a location – compared to smaller firms (Hayter, 1997).

Another implication of the institutional model is that firms can become 'embedded' in their current location, and thus relocating becomes less appealing. Persillet and Shonkwiler (2013) defines 'organisational embeddedness' as a firm's participation in external organisations and networks – the primary goal of which is mutual knowledge exchange or acquisition for its innovative activities. Locational embeddedness is the extent to which a

[4] Homo economicus assumes that individuals are rational / make rational decisions to maximise their utility.

firm's relationships (such as with suppliers, research institutes, governments) are tied to the location.

Potential drivers of firm relocation

In the following two sections, we set out a 'long-list' of potential factors that could, in principle, affect firms' relocation decisions and discuss how we may expect drivers to vary across types of firms and relocations.

'Long-list' of potential drivers of firm relocation

The theories of relocation set out above have the following implications for the potential drivers of firm relocation:

- The neo-classical theory of firm relocation suggests that *location* decisions will be based on factors that maximise profitability. Furthermore, *relocations* will be triggered by changes in internal factors (e.g. expansion plans) and/or external factors (e.g. wage rates).
- The behavioural theory suggests that some firms (in particular smaller or less experienced ones) may not make optimal decisions due to a lack of information or ability to interpret it. It also suggests that factors that affect the welfare of the decision makers and the perceptions held by decision makers, can be important factors.
- The institutional theory suggests that firms can themselves affect the characteristics associated with locations that are assumed to be static in the neo-classical model. Larger firms in particular, may be able to negotiate better terms – and therefore be more likely to move, or more likely to move to a particular location, than they otherwise would be. Furthermore, the institutional theory suggests that those that are embedded within their location – more likely those that have been in their current location for longer – are less likely to relocate at all.

On the basis of the above, we have developed a list of drivers that could, in principle, affect relocation choices. Notably:

- Some drivers could affect relocation behaviour for multiple reasons, and these reasons could act in opposing directions. For example: larger firms may have limited location choices that could accommodate their size, and therefore size would negatively affect propensity to relocate; whereas, larger firms may be more able to negotiate with institutions, thus increasing their propensity to relocate.
- Some drivers are likely to be highly correlated with each other, and furthermore some drivers are likely to be drivers of each other. For example, the regional wage rate may be highly correlated with the regional commercial property rate – and the two may be jointly determined i.e. are equilibrium prices.

The above points have implications for empirical analysis of the drivers, which we discuss in more detail later in our report.

As is set out in the following diagrams, we have classified drivers into five groups:

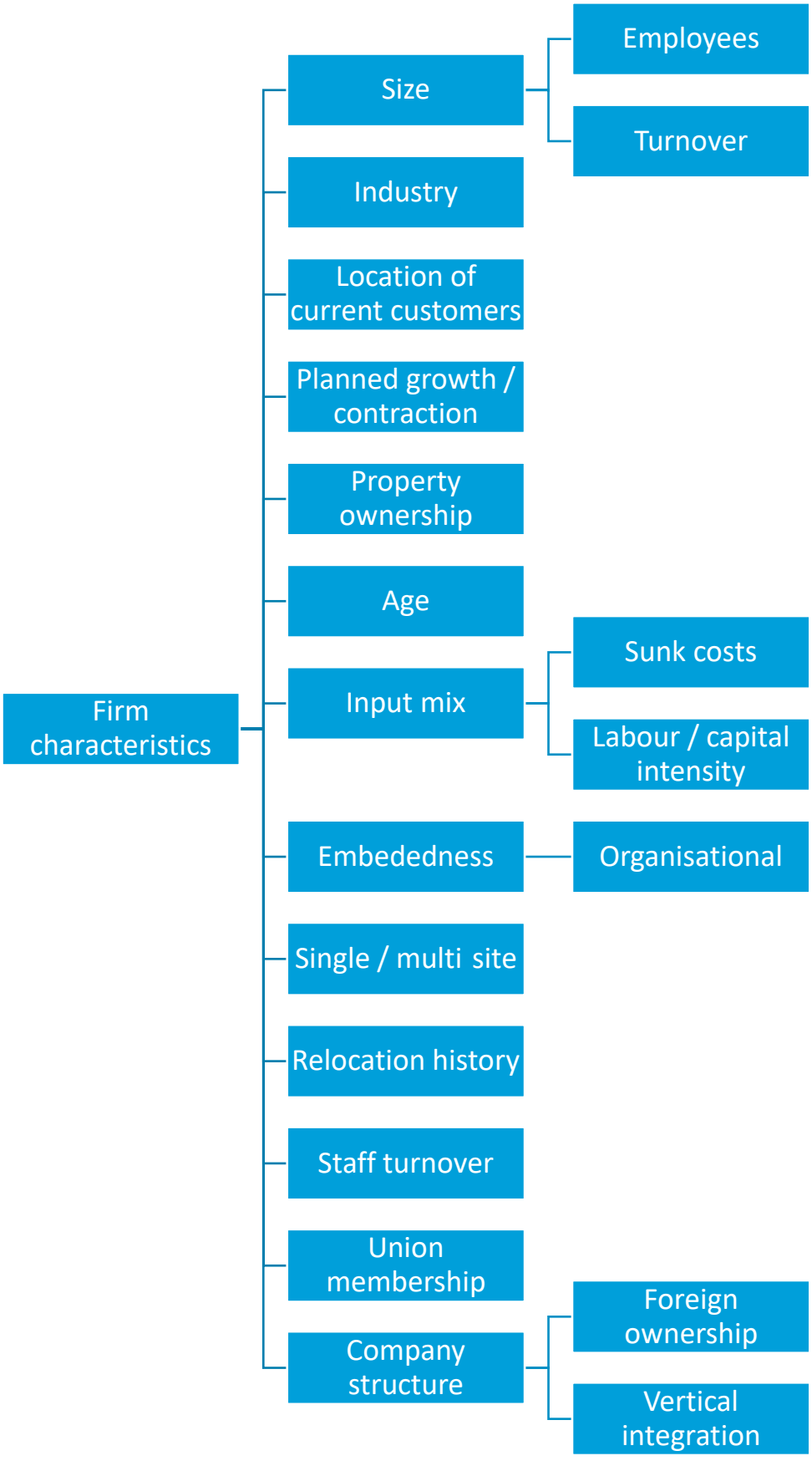
- **Firm characteristics**, which includes both 'fixed' characteristics (such as industry) and changes to the firm (such as planned expansion, the desire to enter new markets, and lease expiry).
- **Decision-maker characteristics**, which covers the characteristics of those making decisions within the firm.
- **Location 'market' factors**, which includes economic factors largely determined by the market, such as local wage rates and commercial property prices.
- **Location 'non-market' factors**, which includes 'non-market' factors related to the specific location, such as crime rates, natural amenities, and culture.
- **Public policy**, which covers factors that are directly determined by government or public sector organisations.

We note that the distinction between 'market' and 'non-market' location factors can be somewhat 'fuzzy'. The former generally has a direct impact on the profitability of a firm, whereas the latter can have indirect effects on profitability. 'Market' and 'non-market' factors may also be closely related. For example, a location with a lower crime rate and better cultural attractions may have higher commercial property prices.

We also note that in relation to international relocations, our conceptual framework, and the long-list of factors, is applicable to international relocations, but it can reasonably be expected that the relative importance of drivers will be different for international relocations.

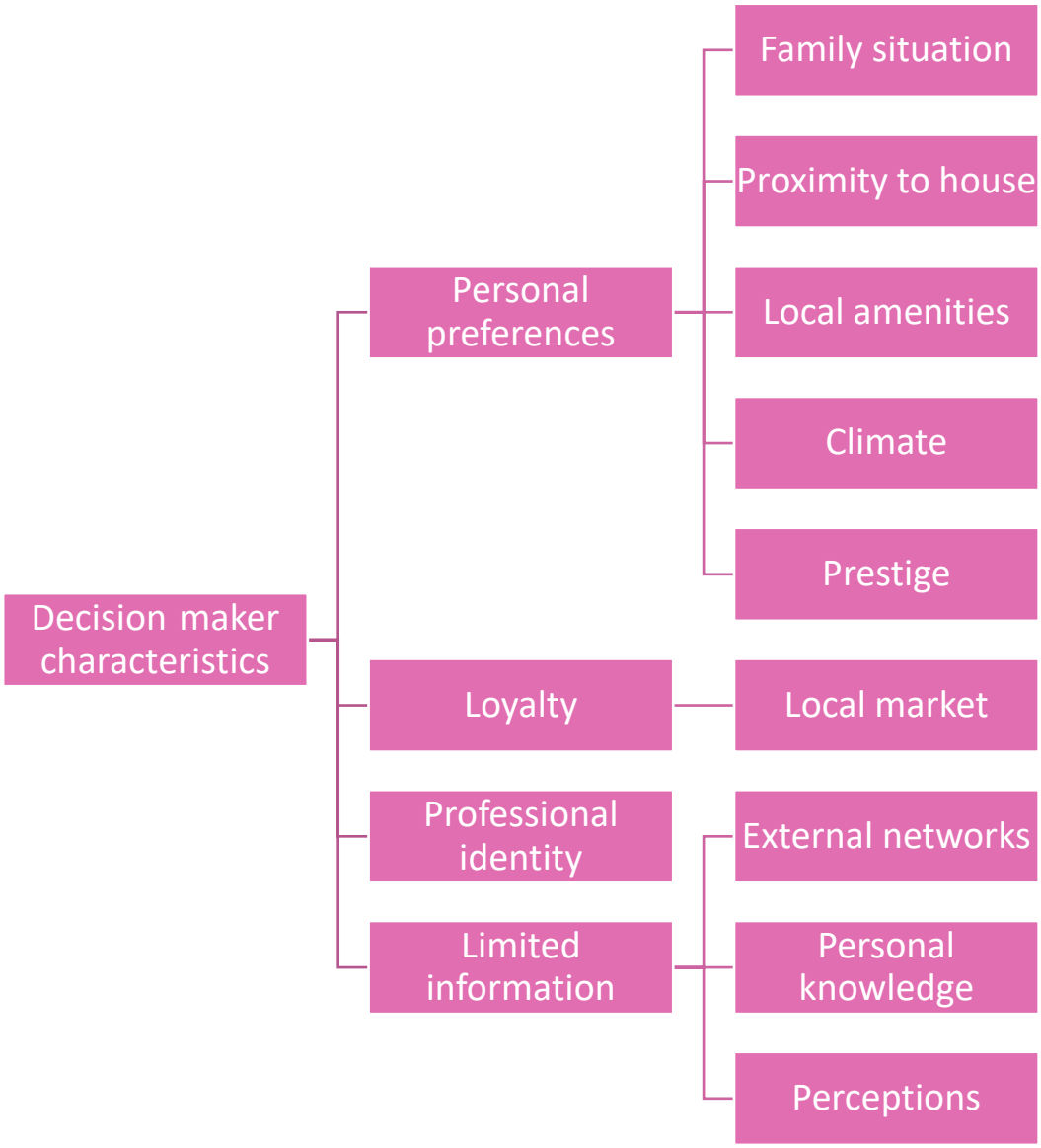
In addition to the drivers identified in our long-list, it can be expected that other factors that are common to all firms and all locations, but that vary over time, will affect relocation behaviour. For example: a growing economy may mean that firms need to relocate to expand production; and decreasing removal costs may, at the margin, increase the propensity of firms to relocate. We do not consider these wider drivers further, as they are usually hard to capture within a 'time shot' of the data.

Figure 7: Firm characteristics



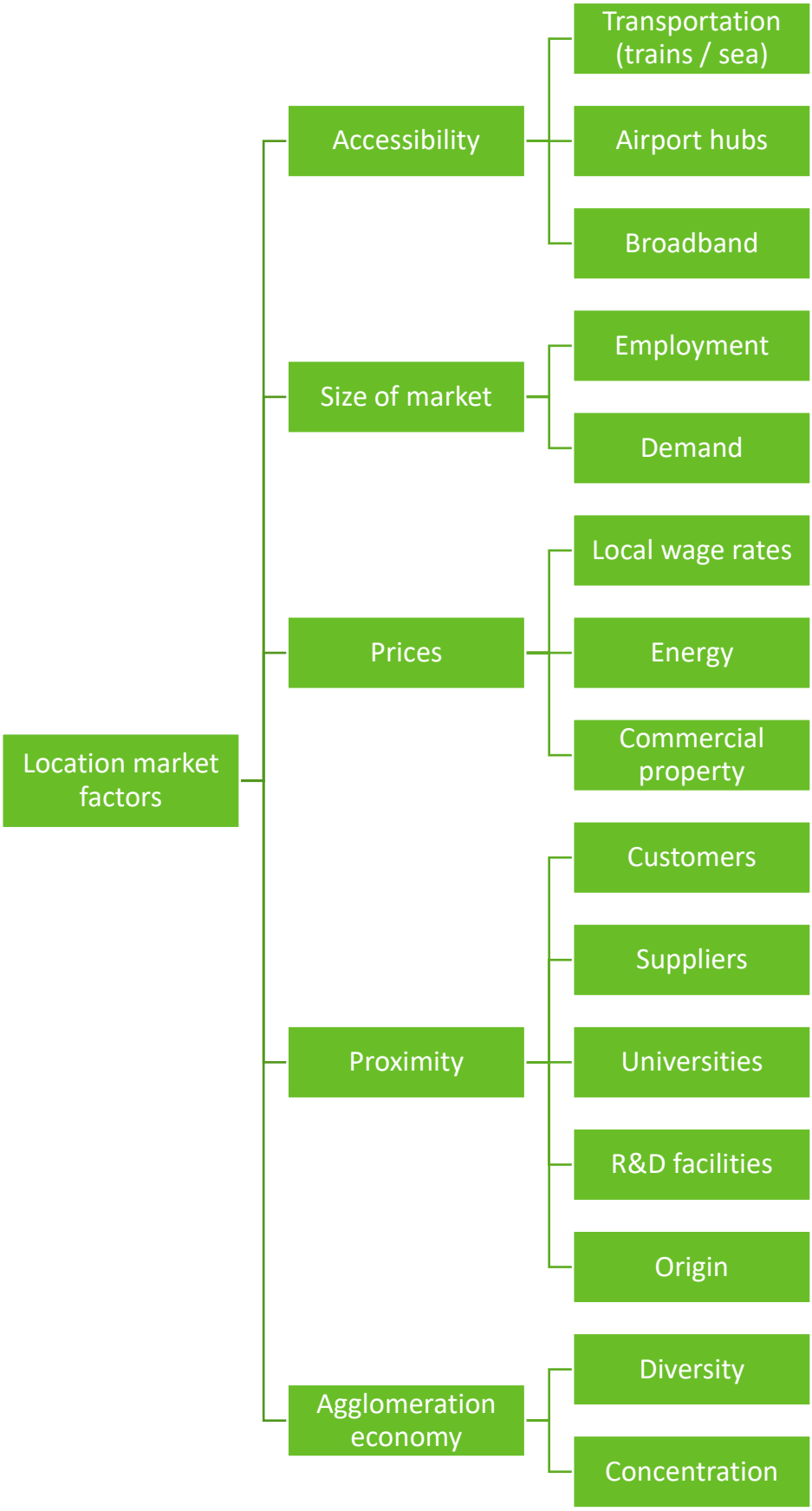
Source: Economic Insight

Figure 8: Decision-maker characteristics



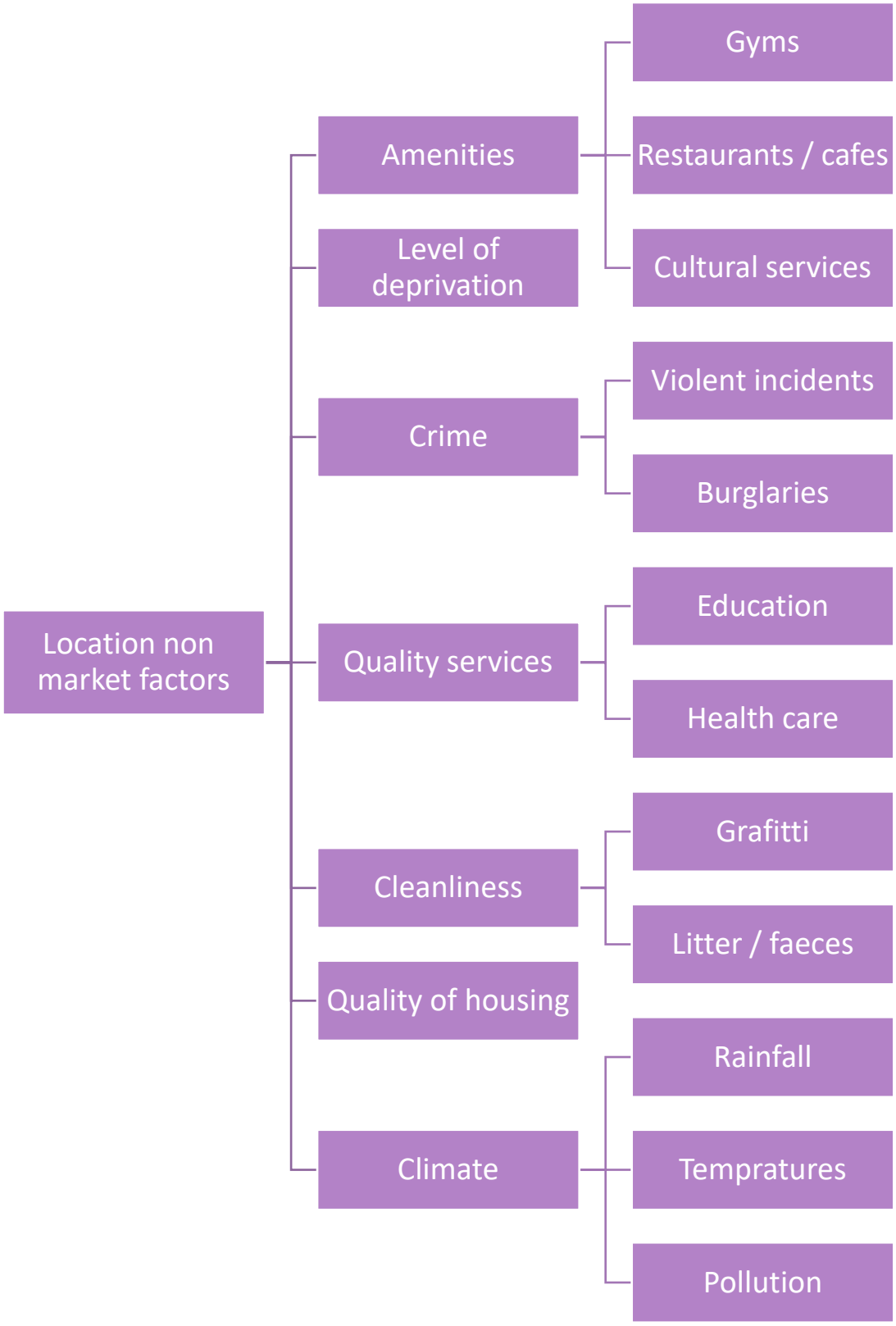
Source: Economic Insight

Figure 9: Location 'market' factors



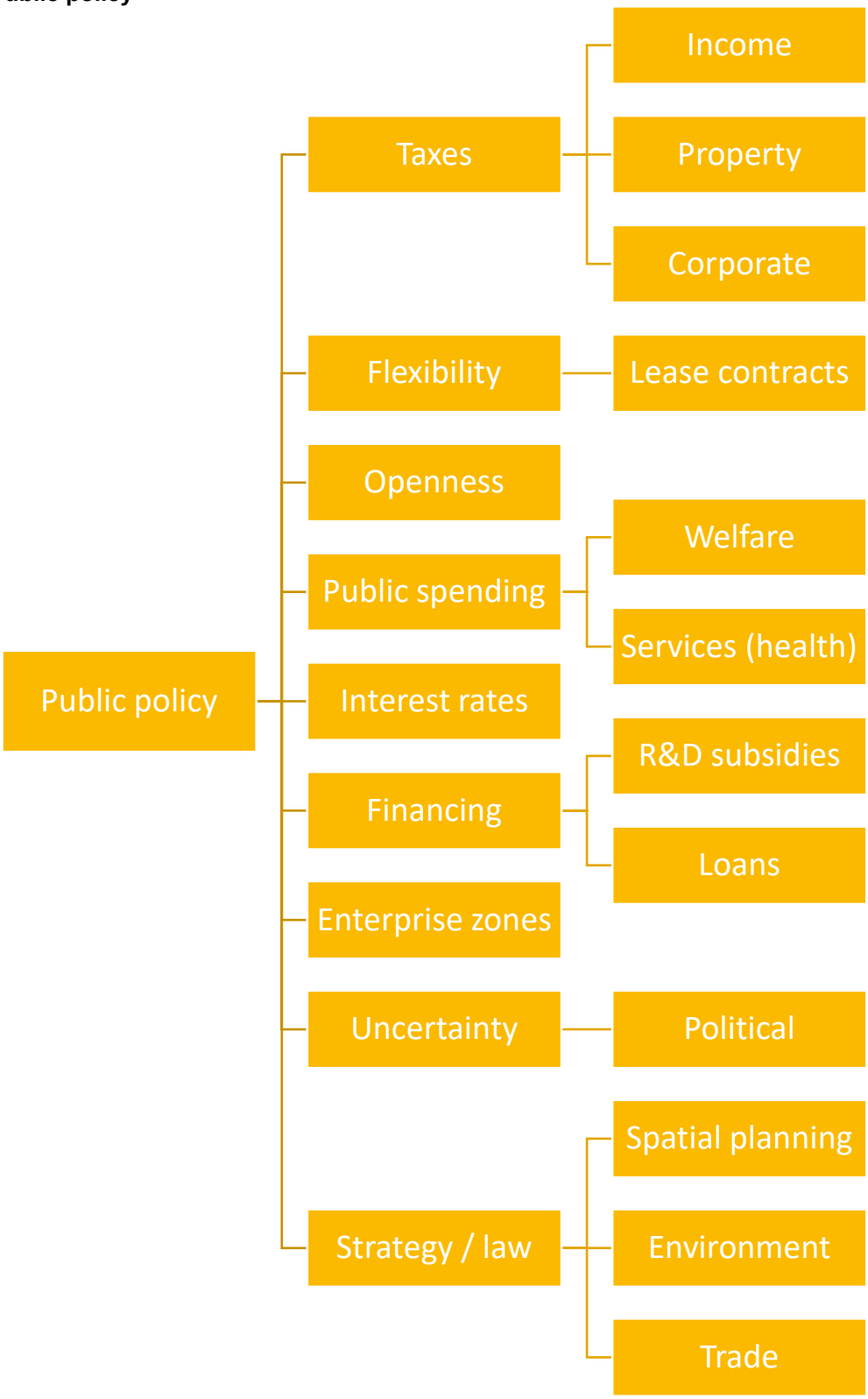
Source: Economic Insight

Figure 10: Location 'non-market' factors



Source: Economic Insight

Figure 11: Public policy



Source: Economic Insight

Variation across types of firms and relocations

The drivers identified above are likely to vary between both types of firm and types of relocation. Whilst there is a wide range of dimensions across which drivers may vary, we discuss three prominent examples.

- **Size of firm**. The behavioural and institutional theories suggest that firms of different sizes are likely to make relocation decisions in different ways. Intuitively, smaller firms are likely to locate close to where the owner lives. Stam (2007), for example, puts forward a conceptual framework in which the decision-making process evolves through the phases of a firm's life.

- **Distance of relocation**. For example: relocations that take place over relatively small distances are unlikely to be affected by changes in wage rates; relocations within the UK are unlikely to be affected by tax rates (with the exception of enterprise zones); whereas, international relocations naturally have a much wider range of potential factors that can affect decisions.

- **Industry**. Factors that affect one industry are unlikely to affect others. For example, basic manufacturing firms are unlikely to base relocation decisions on the proximity to R&D facilities. As discussed further in the next chapter, research has estimated separate statistical models for different industries – such as Weterings (2012).

Further to the last point above, Table 3 below identifies some key factors that can be expected to affect the propensity of firms to relocate and the location choice, across different industries focused on in this research. We identify factors that are likely to be more important to an industry, relative to an 'average' firm – and therefore factors that could affect all firms equally are excluded. We also note the that we have made generalisations about industries, which may not hold true in all cases.

Table 3: Key factors by industry

Manufacturing	
Propensity to relocate	**Location choice**
• **Fixed capital**. The greater the amount of fixed capital that is costly to move or entirely 'sunk', the lower the probability to relocate. • **Firm-specific human capital**. High value manufacturing firms, for example, may employ people with high firm-specific human capital, and be less likely to relocate due to the risk of losing key staff.	• **Input and output transport costs**. Location choice will be sensitive to the ability and cost of transporting inputs to the site, and outputs to customers. • **Availability of skilled labour**. Manufacturing firms will choose a location with adequate supply of appropriately skilled labour.
Professional services and technology	
Propensity to relocate	**Location choice**
• **Firm-specific human capital**. The more firm-specific human capital in a firm the less likely it will be to relocate. • **Location of clients**. If a firm is already located close to its customers, it will be less likely to relocate.	• **Availability of skilled labour**. Firm will locate where there is sufficient skilled labour. This may be related to the presence of universities, agglomerations, and quality of life. • **Access for staff and clients**. Location choice will take into account accessibility for staff and clients.

4. Existing empirical evidence

This section of our report presents the results of our literature review of existing empirical evidence. In summary:

- There appears to be a **relatively low propensity of firms to relocate**, and this **decreases significantly as the distance of relocation increases** (Hospers, 2011).
- Existing empirical evidence suggests that **the main driver of the decision to relocate is planned expansion or contraction** (Brouwer et al., 2004). This can arise either through the firm growing organically or through acquisition. Cost savings and the effects of government policies are broadly seen to be secondary factors. As is summarised subsequently, there are various firm characteristics that are associated with higher and lower propensities to relocate.
- Academic papers tend to focus on particular drivers, types of firm, or types of relocation, and therefore **it is more challenging to draw broad conclusions about the relative importance of different factors in terms of the drivers of location choice**. KPMG (2016), for example, identifies the three most important drivers as **availability of skilled labour**, **access to transport**, and **quality of life**. More widely, the literature has found that many of the drivers identified in the previous chapter can significantly affect location choice. **Distance from original location** is often found to be a significant driver in the choice of where to relocate to (de Bok and van Oort, 2006).
- Evidence has been found of the drivers varying by the characteristics of firms. For example, **smaller firms are more likely to base location choices on personal preferences** (Stam, 2007; Greenhalgh, 2008) and **retail and professional services firms place more weight on access to transport** (de Bok and van Oort, 2006).
- There is **limited recent academic literature studying firm relocation in the UK** specifically. Hence, the importance of this study to provide up-to-date evidence. However, the existing UK-specific evidence is broadly consistent with research from other countries, which suggest that evidence from elsewhere is likely to also be relevant to the UK.
- Evidence from UK based commercial real estate services firms suggests that UK firms relocate to save costs and gain access to labour markets. For example, **cases of firms moving from London to other major cities has been noted** (Cushman and Wakefield, 2016). Alongside lower wage and commercial property rates, firms report a better quality of life outside of London as a key factor. Despite this, the vast majority of large firm relocations are understood to take place over very small distances (Savills, 2016).

- Further evidence from the UK suggests that there are **significant differences in the quality of life across the UK**, and this may be driven by factors including **access to employment** and **pollution** (Gibbons et al., 2011). As the availability of skilled labour is a key factor in firms' location choice, factors that affect individuals may also affect firms. In addition to firm relocations happening infrequently, recent evidence identifies that the proportion of individuals that relocate for the purpose of work is relatively low (Clarke, 2017).

The evidence in relation to the propensity of firms to relocate is broadly consistent across studies. As such, Table 4 below provides a summary of the identified drivers and the statistically significant effects found in the literature.

Table 4: Drivers of the choice to relocate identified in the literature

Driver	Effect	Example literature
Expansion / contraction	Significant changes in size **increase** propensity to relocate	Brouwer et al. (2004); Pellenbarg et al. (2002); de Bok and van Oort (2006)
Merger / acquisition	A recent merger or acquisition **increases** propensity to relocate	Brouwer et al. (2004); Strauss-Kahn and Xavier (2006)
Size	**Smaller** firms are **more likely** to relocate	Brouwer et al. (2004); Pellenbarg et al. (2002); de Bok and van Oort (2006)
Industry	**Manufacturing** and **retail** firms are **less likely** to relocate	Pellenbarg et al. (2002); Pennings and Sleuwaegen (2000)
Previous relocation	Firms that have recently moved are less likely to relocate again in the near future, but more likely to relocate in the distant future	Hu et al. (2008)
Age	Older firms are **less likely** to relocate	Sleutjes and Volker (2012); Brouwer et al. (2004)
Single- or multi-site	Single-site firms are **less likely** to relocate	Brouwer et al. (2004)

Driver	Effect	Example literature
Property ownership	Firms that own property, rather than renting it, are **less likely** to relocate	Risselada et al. (2012)
Lease expiry	A recently expiring lease **increases** the propensity to relocate	Greenhalgh (2008); Schmidt (1979)
Markets served	Firms that only serve **local markets** are **less likely** to relocate	Brouwer et al. (2004)
Transport	Firms with good access to transport and **less likely** to relocate	de Bok and van Oort (2006)

Source: Economic Insight

In the concluding chapter of this report, we provide a comparison of the results from the literature review with findings from interviews and econometrics.

The rest of this chapter provides further details. In turn, we:

- highlight the overall propensity of firm relocation found in previous studies, and what the 'main' drivers of the choice to relocate are;
- present evidence to the relative importance of drivers of the choice of location;
- discuss UK-specific evidence; and
- summarise the findings from the more general literature in terms of the groups of drivers we identified in the previous chapter.

Where possible, we have specified the magnitudes of the effects identified in the empirical evidence[5]. Further details of our approach to the literature review can be found in the appendix.

Prevalence of relocation and relative importance of factors

We first consider existing evidence on the prevalence of relocations, and the relative importance of factors that affect the choice to relocate.

[5] A number of papers do not report marginal effects from regression models, or enough information for us to calculate them – in these cases we report the sign / direction of the coefficients.

Prevalence of relocations

The literature suggests that the propensity of firms to relocate is relatively low, and that it decreases with the distance of relocations studied. For example:

- Brouwer et al. (2004) found an annual moving rate of 2.7% among firms with more than 200 employees across 21 mainly European countries, for the period 1997-1999.
- Conroy (2015) studies US manufacturing firm relocations between origin-destination state pairs over the period 2000-2001. It found that of the 8,750 origin-destination state pairs with a positive annual relocation count over the study period, about half had only one firm relocating. The highest relocation counts were consistently between the adjacent states of New York and New Jersey.
- Van Oort et al. (2007) found that, over the period 1999–2006, 75% of migrating Dutch entrepreneur firms stayed in the same municipality, while only 6% of them left for a surrounding region.

Hospers (2011) concluded that:

> *"Generally, firm migration over short distances is the rule, while long-distance migration is the exception."*

Relative importance of factors

Although there is significant variation, the literature suggests that the main driver of firm relocation is expansion. This can arise either through the firm growing organically or through acquisition. Economic factors that allow the firm to minimise costs, and the effect of government policy are seen to be second order drivers. For example, Brouwer et al. (2004) concluded:

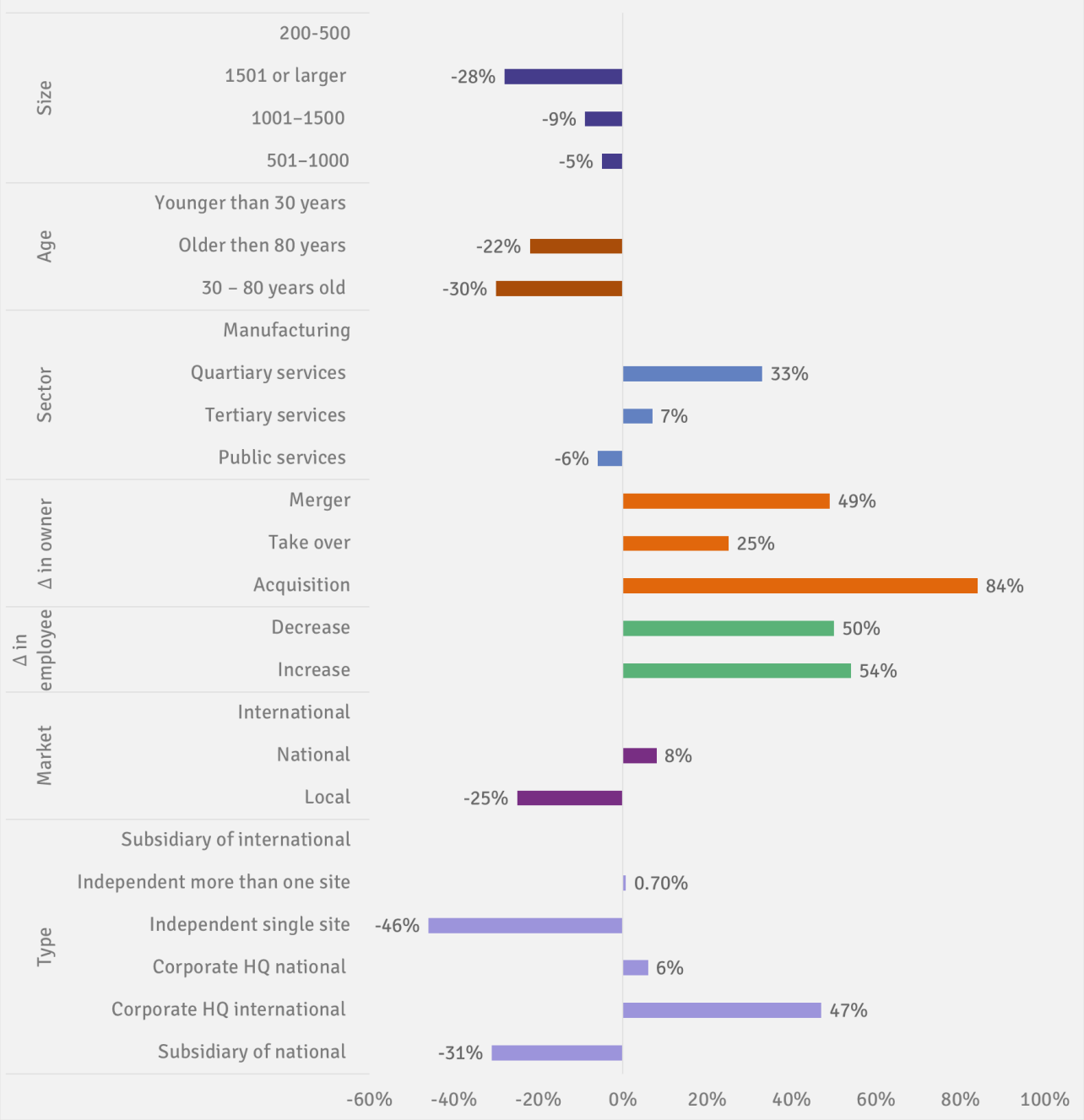
> *"According to the literature, the main forces driving firm relocation are expansion and the need for more suitable premise… A second reason is cost saving. Firms aim at taking advantage of favourable cost conditions in other locations i.e., due to wage differentials, scale economies, energy prices, local incentives or other factors. Access to raw material and energy sources and market-oriented strategies are other prevailing motivations. Finally, firms are 'pushed' to move by government policy through subsidies."*

This view is also supported by other literature, such as Pellenbarg et al. (2002), Hayter (1997), and Chan et al. (1995). However, the full range of possible drivers are not reflected in any of the empirical models that we have reviewed, and this view appears to be an evaluation of the evidence 'in the round'. Furthermore, it is clear that: the drivers of the choice to relocate vary significantly; the decision is highly complex; and therefore, any judgement of what the 'main' drivers are is subjective.

One relatively comprehensive study that provides evidence as to the relative importance of different drivers is Brouwer et al. (2004). The paper studies the probability of relocation of firms with 200 or more employees from a range of mainly European countries. It finds that

acquisition and changes in employment have the largest effect on the estimated probability of a firm to relocate, as illustrated in Figure 12 below.

Figure 12: Relative importance of factors in the choice to relocate[6]



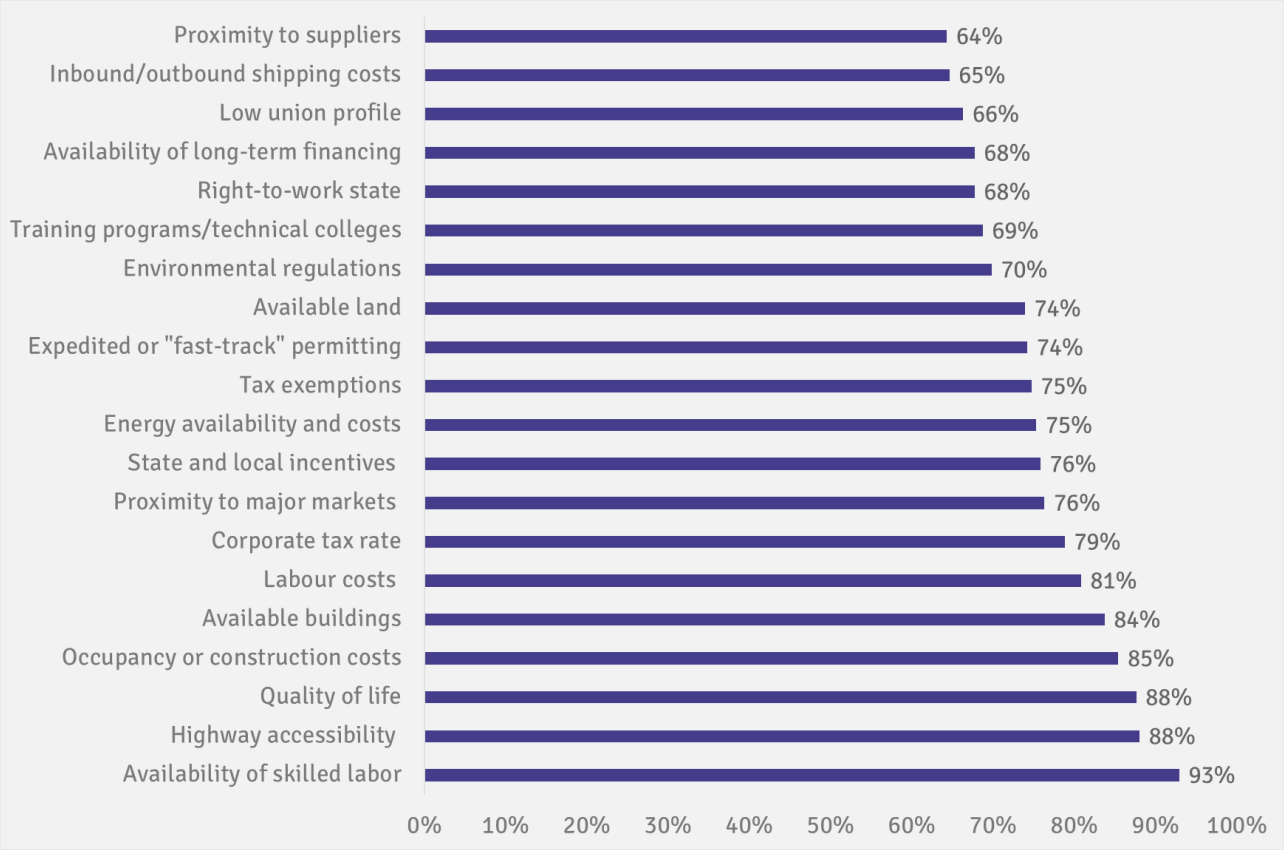
Source: Brouwer et al. (2004)

[6] The chart shows the percentage effect of each dummy variable on the estimated probability to relocate. For example, firms with 1,501 or more employees are estimated to be 28% less likely to relocate than those with 200-500 employees.

Relative importance of factors in location choice

Similar to the choice of whether to relocate or not, the choice of where to relocate to is highly complex. As can be seen in the subsequent sections of this chapter, academic papers tend to focus on specific drivers, types of firms, or types of relocation. KPMG (2016), however, provides an overall picture of the relative importance of different factors when choosing a site location. As is shown in Figure 13 below, it suggests that the most important factors are availability of skilled labour, access to transport, and quality of life.

Figure 13: Relative importance of factors in the location choice (% citing factor as important)



Source: KPMG (2016)

UK-specific evidence

As described below, there is limited recent academic empirical analysis of the drivers of firm relocation within the UK. However, a number of commercial real estate services firms produce research, case studies and opinion pieces which provide recent and relevant insight into firm relocations within the UK.

Academic literature

Greenhalgh (2008) is the most recent empirical academic research that has been conducted in relation to UK firm relocations. Based on interviews with 28 firms in Tyne and Wear in England, it explores how relocation decision-making varies between firms of

different sizes. It identifies the following themes/factors that are taken into consideration when making a decision on relocation: improved performance growth and expansion; access, location, proximity to staff and customers; the influence of public sector intervention; tenure; the contribution of property to business performance; structure, changes and rules; market perceptions; property characteristics; and time and chance. This paper is also discussed in more detail later in this chapter.

Further UK-focused empirical research includes, in reverse chronological order:

- Bloom and Griffith (2001) analyses the relocation of R&D activities from other countries to the UK, and from the UK to other countries from 1979 to 1997. The paper finds a positive relationship between the amount of R&D conducted in one country and the price (including tax) of conducting R&D in its major Foreign Direct Investment partners. Additionally, it finds that that domestic user cost of R&D is negative and statistically significant with an impact elasticity of 0.14.

- Carlton (1982) analyses the location decisions of 89 firms within three specific manufacturing sectors in the UK between 1967 and 1971. It found that a 1% change in electricity prices have the smallest impact on the probability of firms locating to a particular location that are in the 'communication transmission equipment' industry as compared to firms belonging to the 'fabricated plastic products' industry or the 'electronic components' industry- the rationale is that firms belonging to the 'communication transmission equipment' industry are the least energy-intensive.

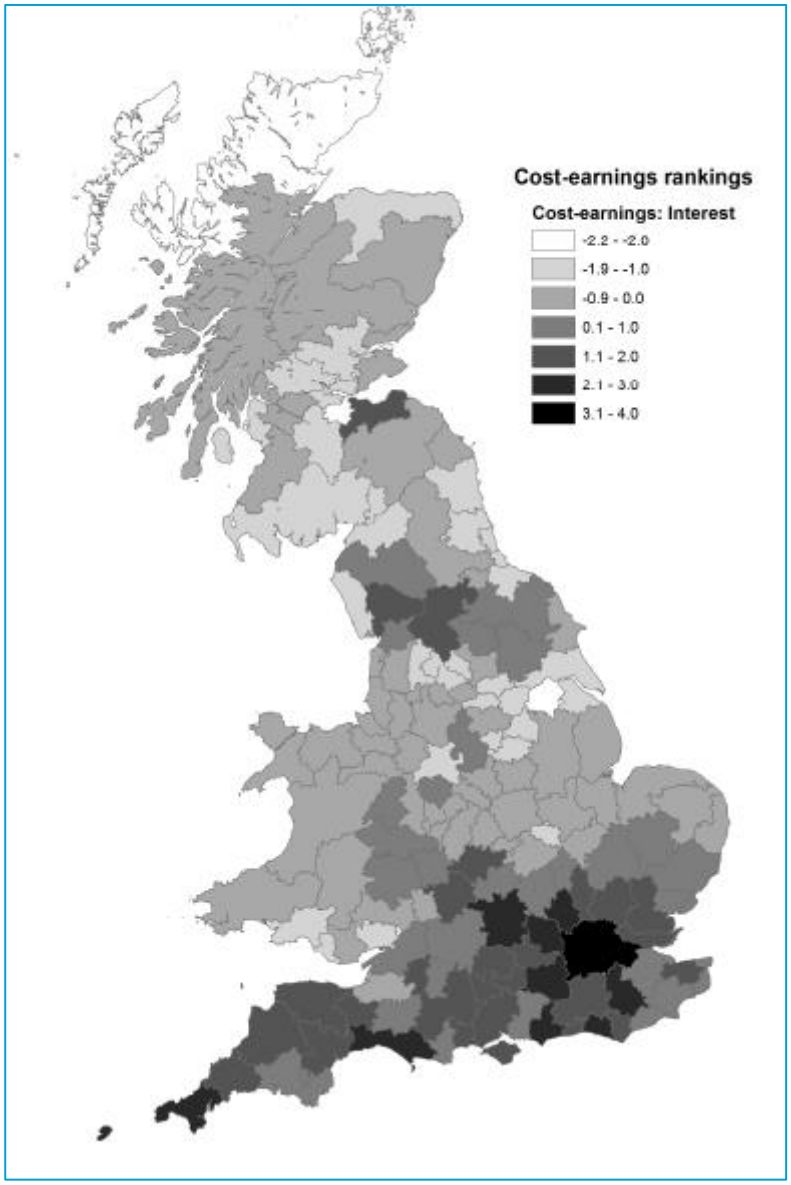
- Ashcroft and Ingham (1982) examines the movement of foreign firms to the UK and the movement of indigenous firms in the UK between 1950 and 1971. The results of the modelling of firm inflows suggest that foreign firms were attracted to the UK because of its market size and the availability of industrial and regional incentives (such as investment incentives that were available in Development Areas, and the operation of the Local Employment Act 1960). Modelling of the movement of indigenous firms within the UK suggests that relocation was largely a result of tight labour supply.

- Keeble (1972) studies the relocation of manufacturing firms in the UK from the South East and West Midlands to peripheral areas between 1945 and 1965. The paper finds that distance (between centres of economic regions and peripheral areas) and labour availability are strong determinants of industrial relocation to peripheral areas. For example, labour availability explained approximately 86% of observed movement variation from the South East, and 63% for movement from the West Midlands.

In addition to research that focuses on firm relocation, we have also considered wider evidence in relation to the movement of individual workers. For example, Gibbons et al. (2011) estimates the quality of life in labour market areas within Great Britain based on the difference between housing costs and earnings – as is illustrated in Figure 14 below. Further analysis conducted by the authors suggests that the largest drivers of their quality

of life measure were access to employment and pollution, and other significant drivers included rainfall and the presence of museums.

Figure 14: Estimate of quality of life (housing costs minus earnings) for labour market areas[7]



Source: Gibbons et al. (2011)

Clarke (2017) also finds that the rate of migration for the purpose of work within the UK is relatively low (0.6% in 2016 for employed individuals), and lower than the 2001 peak (0.8%).

[7] Darker shaded areas are estimated to have higher quality of life. For example, for a given level of housing costs, the better the quality of life in an area the lower the wage will need to be in the equilibrium.

Recent evidence from commercial real estate services firms

Commercial real estate services firms have produced a range of publicly available evidence that provides both an insight into the drivers of firm relocation and trends that have emerged over time. This evidence suggests:

- Some firms move certain functions out of London, or choose other cities to expand into. Cushman & Wakefield (2016) summarised that: "*we have seen lawyers, banks and professional services firms move away from the capital in order to attract and retain the right talent, lower their cost of real estate and reduce their wage bill*". Examples given included: Deutsche Bank relocating from London to Birmingham in 2015; Simmons & Simmons choosing Bristol its first expansion outside of London, in 2012; and Balfour Beatty establishing a shared services centre in Newcastle in 2010, which moved some functions from other locations including London. Such outward migration from London is presented as an observation of recent relocations, and no statistics are given to quantify it or make comparisons over time.

- Birmingham is seen by commercial real estate services firms as an increasingly attractive city for firms to relocate to. Following HSBC and Deutsche Bank's decisions to relocate over 1,000 roles from central London to Birmingham, Savills suggests more London-based financial and insurance sector companies may seek space in the city – which is consistent with industry clustering / agglomerations. The firm estimates that the average annual saving in staff and property costs per employee when relocating from central London to Birmingham is circa £20,000.[8] Knight Frank (2017) also discusses why Birmingham has been a destination for many firms. In particular, it identifies the following drivers: wellbeing of employees; amenities for work-life balance; connectivity; sense of community; and strong brand identity.

- Local labour markets are important for firms across the skills range. Firms requiring highly skilled labour benefit from being located close to universities. Cushman & Wakefield (2016), for example, discusses the case of Simmons & Simmons choosing Bristol as is first location to expand into outside of London, partly because of the talent pool – arising from the two universities, the professional training schools, and existing law firm presence in the area. At the lower end of the skills range, in looking for a suitable location for a contact/support centre in the UK, Amazon were reportedly looking for a good labour pool without having to compete for staff with other call centre operators.[9]

- Despite the above, Savills reported in 2016 that 'corporate' occupiers in Greater London and the South East move an average of just 6.9 miles when they relocate, but the most common distance was just 0.5 miles.[10] It analysed every Grade A relocation over 20,000 sq ft since 2010 in the Greater London and the South East region, and

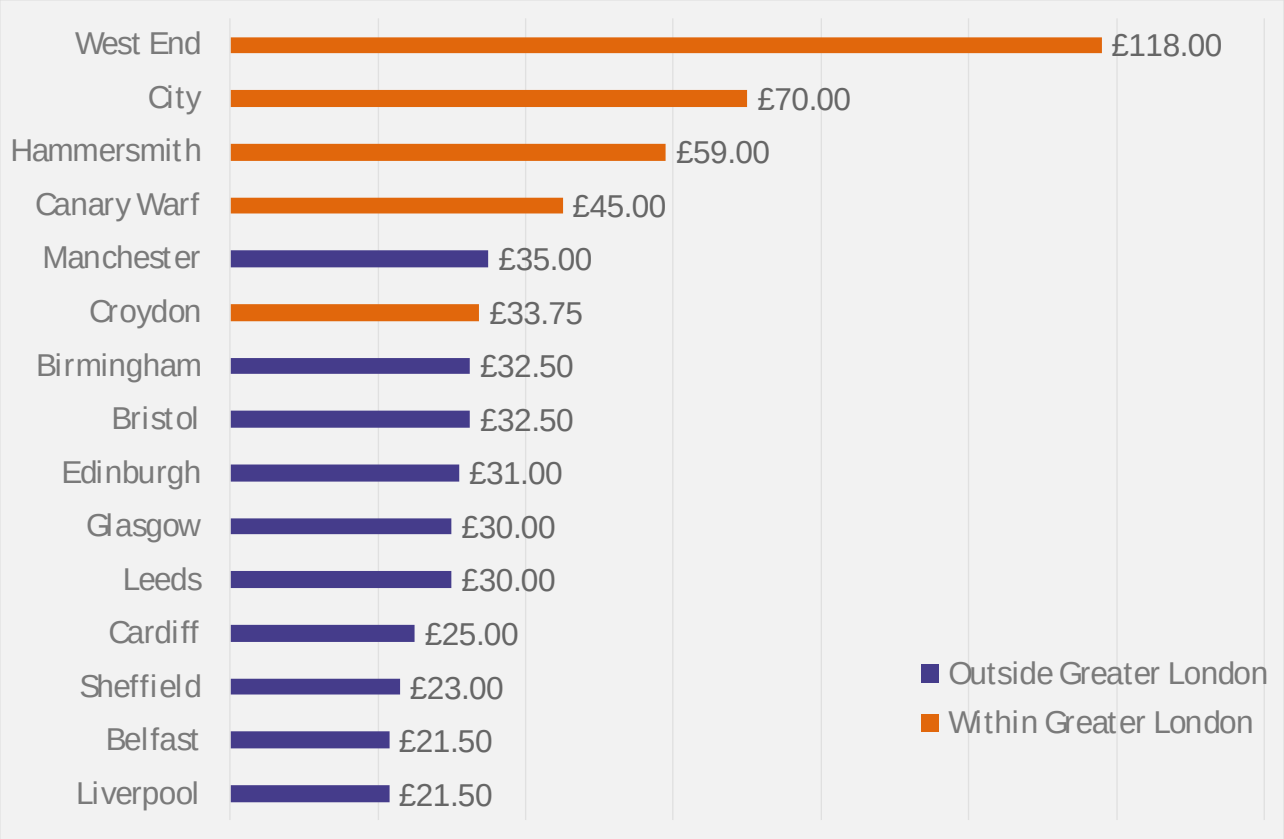
[8] Savills press release, retrieved from its website December 2017.
[9] Case study on Cushman & Wakefield website, retrieved December 2017.
[10] Savills press release, 19th January 2016, retrieved from its website December 2017.

concluded that most companies were driven by finding better quality accommodation and retaining staff, rather than cutting costs – and therefore chose to stay in the same area instead of moving elsewhere to find lower rents. However, Savills noted that this could change as property costs in London and the South East were expected to continue to rise, and firms may split their front and back office operations.

In addition to the more qualitative evidence presented above, commercial real estate services firms produce estimates of average commercial property prices. This data can be used as an indication of the attractiveness of areas to firms, because more attractive areas can be expected to have higher prices. Figure 15 below shows the estimated achievable open market rent for prime offices in 2017, across 15 selected UK locations. As can be seen:

- Office space in central London is considerably more costly than in other parts of the country.
- However, there are parts of Greater London that are on a par with large UK cities outside of London e.g. Croydon is at a similar level to Manchester and Birmingham.
- Outside of London, there is still significant variation in rental costs. For example, rent in Manchester is more than 60% higher than that in Liverpool and Belfast.

Figure 15: Grade A office achievable open market rents (£ per sq ft) as at June 2017 for selected UK locations[11]



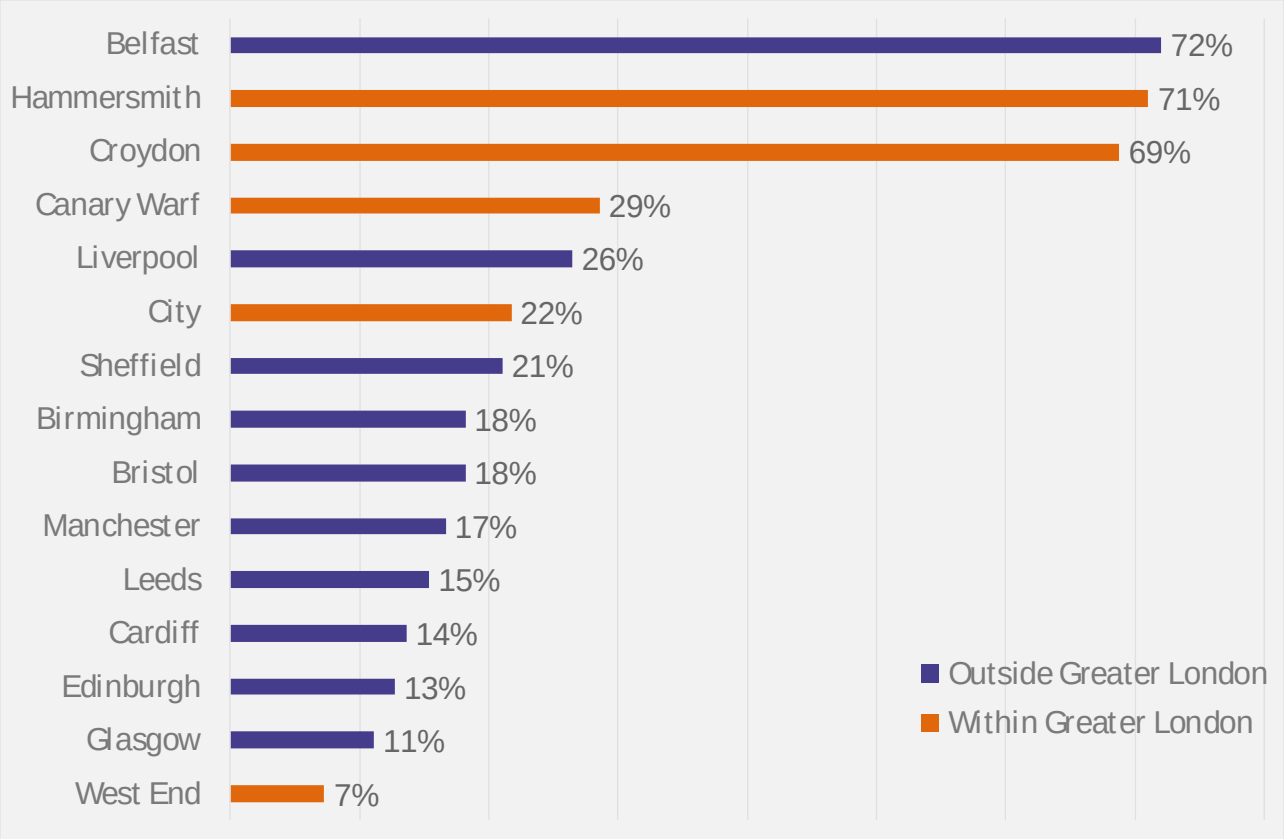
Source: Colliers International

Furthermore, Figure 16 below shows the percentage growth in Grade A office rental prices between 2012 and 2017. Notably:

- The West End, which has the highest rent in 2017, has experienced the lowest rate of growth out of the selected locations. This means that it has remained the most costly location over the last six years, but the amount by which it exceeds other locations has been diminishing.
- The three lowest cost locations (Belfast, Liverpool and Sheffield) have experienced the highest growth rates among locations outside of London.
- Aside from the West End, other locations in Greater London have experienced relatively high growth.

[11] Estimates are based on new units of 10,000 sq ft in prime office locations taken for a 10 year term certain.

Figure 16: Percentage growth in Grade A office achievable open market rents between 2012 and 2017 for selected UK locations[12]



Source: Colliers International

These changes in prices could, in part, reflect increased demand from relocating between the locations. However, there are various other factors which may account for changes in rental prices, including changes in demand arising within the locations themselves e.g. local firms expanding.

In the following sections, we present the evidence from the academic empirical literature in relation to the different groups of drivers that we identified in the previous chapter.

Firm characteristics

The main findings of the literature in relation to firm characteristics are summarised below.

Expansion and takeovers

As discussed previously, the literature finds that expansion is one of the main drivers of relocation, and the empirical studies have been largely consistent in identifying a statistically significant relationship between decision of relocation and expansion. For example:

[12] Estimates are based on new units of 10,000 sq ft in prime office locations taken for a 10 year term certain.

- Brouwer et al. (2004) finds that firms that experienced a decrease / increase in the number of employees were more likely to relocate. Specifically, a 5% or greater increase in the number of employees was found to increase the probability of relocation by about 55%. Additionally, firms involved in acquisition, merger, or takeover activities were 25-85% more likely to relocate.

- Pellenberg et al. (2002) examines the probability of relocation for firms in the Netherlands between 1999 and 2006. The study includes an index that contains variables capturing growth in the number of employees, and the result shows a statistically significant coefficient (although the paper is not specific about the magnitude of the effect).

- de Bok and van Oort (2006) which presents econometric analysis of firms with 3 or more employees in the province of South-Holland in the Netherlands over the period 1990–1996, found a positive statistically significant relationship between absolute growth rate and the probability to relocate- after controlling for firm characteristics and attributes of its current location.

Size

The literature is generally consistent in that it identifies smaller firms as having a higher propensity to relocate, controlling for other factors. For example:

- Pellenbarg et al. (2002), which reports on an econometric study of Dutch firms relocating between 1999 and 1997, found that small firms (specifically those with less than 10 employees) had a higher propensity to move.

- Brouwer et al. (2004), which studies the propensity of firms with 200 or more employees from a range of mainly European countries, found that larger firms in the sample were less likely to have relocated. Over the three-year period 1997 to 1999, firms with 200-500 employees had a propensity to relocate of 9%, whereas those of more than 1,500 employees had 7% propensity to relocate.

- de Bok and van Oort (2006) found that higher employee numbers reduced the propensity of a firm to relocate.

However, Alli et al. (1991), which studies the relocation of corporate headquarters of US listed companies between 1980 and 1988, found that larger firms (measured by the value of assets) were more likely to relocate their headquarters than smaller ones. The authors suggested that this was because the larger firms tended to be less dependent on local markets. The sample included both relocations within regions and between regions, and covered all industries.

Significant differences between small and large firms have also been found in terms of their decision-making processes, and their choice of location. For example, Stam (2007) identifies different stages of development in which firms make different decisions. The

paper presents the conclusions from a survey of 23 fast-growing firms, from the professional; business services; biomedical; graphics-media; and shipbuilding industries in the Netherlands. It found that the relocation choices of firms in earlier stages of development were likely to be motivated by the entrepreneur's knowledge of locations, personal preferences, and networks; whereas as firms progress through the stages development these factors become less important, and relocations are more driven by new opportunities or shortages of production space.

Greenhalgh (2008) provides further evidence of the difference between small and large firms, as is detailed in the box below.

An Examination of Business Occupier Relocation Decision Making: Distinguishing Small and Large Firm Behaviour', Greenhalgh (2008)

This paper presents the results of 28 interviews conducted with firms in Tyne and Wear in England. The purpose of the interviews was to explore how business occupiers decided whether and where to relocate.

The author found that large firms tended to base their decisions on outcomes of sophisticated processes that took into consideration multiple factors. Whereas decisions of smaller firms were usually described as being made on 'gut feeling' rather than being based on any processes that took into consideration all the relevant variables.

Moreover, small firms were found to rely more heavily on their external networks and relations due to their bounded local market knowledge. Most interviewed firms restricted their choices to areas that they knew well. In the case of small firms, they had a tendency to locate in an area that was close to their own homes (founder's home), while large firms placed greater importance on locations with wider accessibility. A general distinction was made between: local manufacturers and service providers that need to retain their trained staff and therefore be 'loyal' to their local area; professional services firms to which clients' needs are paramount; and firms such as call centres that can relocate to areas with cheap and plentiful labour.

Industry

Consistent with theory, the empirical literature finds that firms in industrial sectors (i.e. those that typically have large fixed assets) and firms in industries that serve local markets, such as hotels and restaurants, are less likely to relocate. All else equal, professional or producer services firms are found to be more mobile. However, if a company serves a local market (which could include professional and producer services firms), it is less likely to relocate.

Examples of the literature include the following.

- de Bok and van Oort (2006) found that consumer services firms were the least likely to relocate. Furthermore, relative to consumer services, the relocation probability increased by; 25% for manufacturing firms; 70% for construction firm; 100% for transport, warehousing and communication firms; and 110% for producer services firms.
- Brouwer et al. (2004) found that service firms that belong to the knowledge-economy had the highest probability of moving – 33% higher than manufacturing firms. Firms that serve local markets were found to be about 25% less likely to relocate compared to firms that serve international markets.
- Pennings and Sleuwaegen (2000), which assess the probability of firms in Belgium relocating out of the country between 1990 and 1996, found that firms with a low capital to labour ratio (labour-intensive firms) were 25% more likely to relocate.
- Pellenbarg et al. (2002) found that firms in retail and the hotels and restaurants sector had a lower propensity to move compared to those in the industrial sector.

The drivers of relocation within industries also appear to vary. As is illustrated by the two papers detailed in the following boxes.

'What Makes Firms Leave the Neighbourhood?', Weterings (2012)

The results of this paper are based on a panel data of about 108,288 firms in the Netherlands that have relocated between 1999 and 2006. The purpose of the empirical analysis is to examine how characteristics of the neighbourhood affect the probability of relocation. The neighbourhood characteristics that were included in the analysis are measurements of physical disorder, availability of amenities, and violent incidents and burglaries.

Given that neighbourhood activities are expected to have different effects for different industries, the analysis is done separately for business services, consumer services, and manufacturing and wholesale.

For example, moving from the 25th percentile to the 75th percentile in the number of violence incidents increases the base relocation likelihood of a firm in the consumer service industry by 14% compared to a 4% increase for business services.

Similarly, other neighbourhood effects such as the number of shops, cafes and restaurants have a higher effect for consumer services than for business services as it is more likely to have a direct impact on their performance.

Firms in the manufacturing and wholesale industry also prefer more vibrant neighbourhoods, such that a movement form the 25th to the 75th percentile in the presence of shops in the neighbourhood would decrease the base relocation likelihood of firms by around 9%. Moreover, manufacturing firms appear to be particularly influenced by the number of burglaries regarding their relocation decision, where an increase to the 75th percentile in the number of burglaries would increase the likelihood of relocating by around 6%.

Agglomeration Economies, Accessibility, and the Spatial Choice Behaviour of Relocating Firms', de Bok and van Oort (2006)

The results of this paper are based on 5,116 relocated firms in the Netherlands between 1988 and 1997. The paper looks at how measures of agglomeration and accessibility affect the relocation decision of the following industries: manufacturing; construction; transport and distribution; producer services (banking and insurance); and consumer services (retail and personal services).

The empirical analysis control for firm variables such as size, age, and employment growth. The results show that after controlling for the independent variables, the relocation probability seem to differ by industry with firms in the transport industry being the most mobile, and firms in consumer services (including NGOs and retail) being the least mobile. Specifically, relative to consumer services, the relocation probability increases by; 25% for manufacturing firms; 70% for construction firm; 100% for transport, warehousing and communication firms; and 110% for producer services firms.

Measurements of accessibility (train stations and highways) show a modest positive influence on the probability to relocate. Additionally, index estimating industry concentration shows that there is a positive relationship between specialisation and the probability of relocation for firms in the producer services, transport, manufacturing, and construction sectors.

The authors also find that in choosing a location, firms in the producer services, consumer services, and transport sectors assign a positive utility to locations with short commuting trips for business travellers. While on the other hand, all industries studied in the paper assign a negative utility to the distance to original location.

Other firm characteristics

Effects of other firm characteristics that have been identified in the empirical literature include the following:

- Firms that have moved in the recent past are less likely to move again in the near future (Pellenbarg et al., 2002). However, those that have relocated before are more likely to do so in the more distant future e.g. more than 5 years ahead (Hu et al., 2008).
- Older firms are less likely to relocate than younger firms (Sleutjes and Volker, 2012; Brouwer et al., 2004). For example, relative to firms younger than 30, those aged 30-80 are 13% less likely to relocate (Brouwer et al., 2004).
- Single-site firms are less likely to relocate compared to multi-site firms. For example, relative to a subsidiary of an international firm, a single-site firm is about 50% less likely to relocate (Brouwer et al., 2004).
- Firms that own property, rather than renting it, are 24% less likely to relocate (Risselada et al., 2012).
- The expiry of an existing lease can trigger a relocation (Greenhalgh, 2008; Schmidt, 1979).
- There is mixed evidence in relation to the effect of profitability on the probability of relocation. In one paper, firms with higher profit margins were found to be more likely to relocate (Pennings and Sleuwaegen, 2000), but no significant relationship was found in another study (Alli et al., 1991).

Decision-maker characteristics

There is limited empirical literature about the effects of decision makers and the specific decision-making process taken.

- Lankhuizen (2009), which studies 91 US and Asian life sciences companies, showed that over one third of these multinationals' location decisions can be explained by personal ties of executives and directors with certain places.
- Stam (2007) identifies that for firms in earlier stages of development, relocation decisions are more heavily driven by personal preferences and knowledge and perceptions of locations. This is also consistent with Mazzarol and Choo (2003), as detailed below.

A Study of the Factors Influencing the Operating Location Decisions of Small Firms', Mazzarol and Choo (2003)

This paper uses a three-step methodology to study the factors influencing location decisions of firms of different sizes including a survey with 450 firms from Australia, face-to-face interviews and a focus group discussion.

The conclusions drawn are consistent across the three different methods used to analyse the decision-making process. In the case of large firms, higher weight is placed on the following factors: (1) proximity to freight terminals; (2) proximity to major transport routes; and (3) proximity to trade customers. Whereas smaller firms placed less weight on these factors and higher weight on factors such as location's proximity to services for employees such as banks and food outlets, and location's proximity to managers' home.

Indeed, the focus group described larger firms as taking a more 'pragmatic' approach in their decision-making and placing high importance on factors such as the market, labour and transportation accessibility. Moreover, large firms operate through 'a dedicated buying centre when undertaking industrial land purchase'. These centres provide resources and expertise with regard to location decisions.

Location 'market' factors

Empirical studies have included a range of location 'market' factors in their analysis. Some of the research is designed specifically to test whether location 'market' factors affect relocation decisions, whilst other papers use such factors as control variables. We discuss the results relating to the most commonly tested factors below.

Proximity to suppliers, customers and other firms

The literature identifies distance to a range of market participants as a key factor in determining relocation decisions. More broadly, firms can be considered to have 'location-specific capital', such as existing staff, suppliers and clients, that make it less appealing to relocate (DaVanzo, 1981).

Examples of empirical literature include:

- Keeble (1972), as detailed in the box below, finds that the distance from the firm's current location is a significant driver in its choice of destination.
- Conroy at al. (2015), which analyses the relocation of US manufacturing companies in the period 2000-2011, found that firms in states with a low concertation of employment in manufacturing were more likely to move to states with a high concentration (i.e. agglomeration effects).
- Brouwer et al., (2004) found that firms that only serve local markets were 25% less likely to relocate.

'Industrial Movement and Regional Development in the United Kingdom', Keeble (1972)

The paper examines the industrial relocation from the South East and West Midlands to peripheral areas in the UK.

The analysis is done first with a gravity model and second with multiple regression analysis. The models look at movements in terms of distance and labour availability- which appear to have high explanatory power given the large value for R-squared.

The author concludes that the larger the distance between the central economic region and the peripheral region, the less likely that the industry is going to relocate to that peripheral region- where the results are statistically significant.

Input costs

In terms of input costs, previous empirical papers have tended to focus on the cost of energy and the availability of labour (which is related to employment costs). The papers that we have reviewed, which focus on manufacturing firms, have broadly found these two input factors to affect the choice of location. For example:

- Carlton (2001) analyses the location decisions of 89 firms within three specific manufacturing sectors in the UK between 1967 and 1971. It found that electricity costs had large effect on location choice of all three types of manufacturing firms. It also found that the regional unemployment rate only had a statistically significant (and positive) effect on one of the sectors.

- Lavric et al. (2014) analyses the relocation decisions of manufacturing firms in the EU – specifically, 634 relocations between 2002 and 2013 of firms from within the EU to another country (either within or outside the EU). It found that end-user energy prices negatively affected the propensity to move to a particular country. The elasticity estimate has been calculated for energy-intensive firms where it was found that they are almost twice as elastic to energy prices (0.8) as compared to low energy-intensive firms (0.4).

Infrastructure

Access to infrastructure such as good transportation links (e.g. airports, seaports, and train stations) is discussed in the literature as an important determination of the relocation decisions of different industries and business functions. For example:

- Strauss-Kahn and Vives (2006) analyses the relocation decisions of a sample of US multi-site firms between 1996 and 2001. It found that the availability of an airport had an important influence on the choice of location for headquarters. If a city offered a

'small hub' airport the probability of locating in the metropolitan area increased by 40%, whereas if it offered a 'large hub' airport, the probability increased by 90%.

- Hu et al. (2008) studies the likelihood of 1,277 surveyed US firms to relocate between 2003 and 2006. The authors found that factors such as availability of air transport and high-speed internet affected firms' relocation decisions.

- de Bok and van Oort (2006) analyses the relocation probability of 5,116 firms in the Netherlands. The authors find that factors such as accessibility to good transportation links affect the relocation decision of a wide set of industries including producer and consumer services.

Location 'non-market' factors

In the below we present literature in relation to the effect of 'non-market' location factors on firm decisions, the drivers of worker preferences, and the importance of perceptions.

Firm decisions

The literature has explored the relationship between the 'non-market' factors of a location, or the characteristics of the neighbourhood and the relocation decision. These factors generally fall under the umbrella of the assessment of 'quality of life' in a certain location in terms of the availability and quality of amenities and services and the cleanliness of streets and facilities. The literature identifies these factors as particularly important for firms in the consumer services industry as well as small firms in general. For example:

- Weterings (2012) explores the drivers of relocation for a sample of Dutch firms between 1999 and 2006. The paper found that 'physical disorder' (litter, dog faeces on streets, vandalism, graffiti), the number of shops, cafes and restaurants, and the frequency of violent crimes all had a significant impact on the relocation decisions of business and consumer services firms. The relocation decisions of manufacturing firms were much less affected by such neighbourhood characteristics. Moreover, it was found that manufacturing firms' base likelihood of relocation will increase by 6% when the number of burglaries move from the 25th to the 75th percentile.

- Mazzarol and Choo (2003), which explores the location decisions of Australian firms, suggests that the relocation decisions of smaller firms are more driven by factors such as the proximity to local amenities, whereas larger firms are more focused on 'economic' factors. Based on a survey of 450 firms, it found that 'transport and storage' firms were less likely to place a high importance on ease of access to large population centres, and that proximity to public transport was more important to wholesale/retail and construction firms.

- Malecki (1987) presents a literature review of empirical studies related to the location decisions of R&D facilities. A key factor identified is the importance of local labour

markets. Specifically, firms will locate their R&D facilities where they can attract and retain R&D workers. Studies have shown that 'quality of life' is an important consideration for professionals and specialised workers – where quality of life includes measures of housing (quality and cost); cost of living; quality of health services; services and cultural facilities; quality of educational services; crime; climate and pollution. An additional consideration for R&D workers is the 'intellectual atmosphere' of a region which can be measured by the number of universities and the amount of research conducted in the area.

Worker preferences and behaviour

Whilst the location decisions of firms are likely to take into account the preferences and behaviour of workers, we have also reviewed direct evidence as to the preference and behaviours of workers.

As is summarised below, the 'quality of life' in a location is important factor for individuals – but so too is the availability of jobs. Furthermore, research has shown that labour mobility in the UK in the latest available time period (2016) is below its recent peak in 2001.

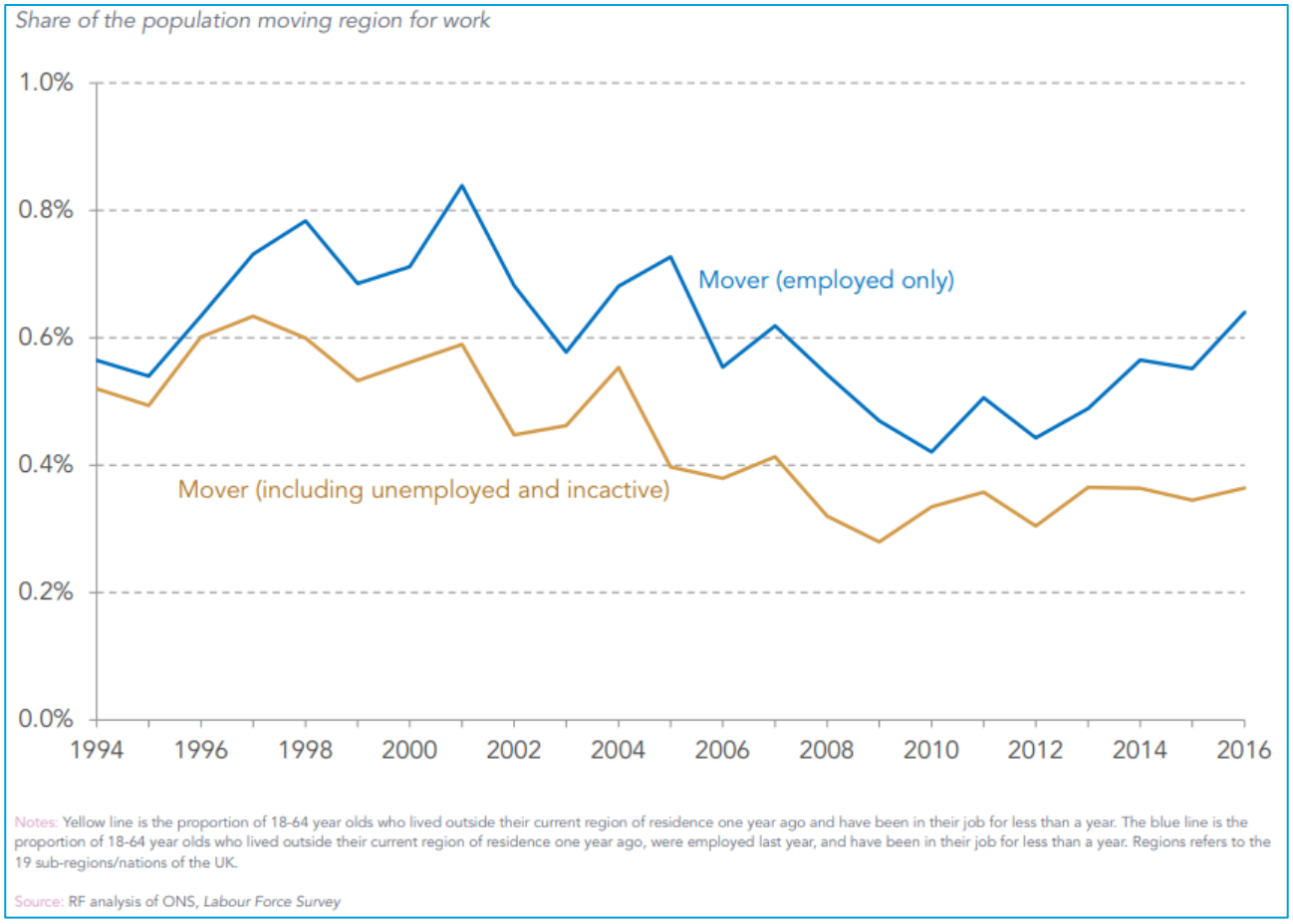
- Gibbons et al. (2011) seeks to quantify the quality of life across labour market areas of the UK based on the difference between housing costs and employment costs. It is based on the assumption that, all else equal, lower levels of local amenities / quality of life in area must be compensated by a higher differential between housing costs and earnings. The authors regress estimates of the value of local amenities / quality of life in area on a range of location-specific explanatory variables. They find that quality of life is positively affected by: availability of employment; woodland cover; the raggedness of terrain; and the presence of museums. Factors that were found to have a negative effect on quality of life were: rainfall; particulate matter (pollution); and crime. Of these factors, particulate matter had the largest effect on quality of life (valued as about £900 per one standard deviation change in the measure), followed by employment accessibility (about £500 per one standard deviation change in the measure). The authors note the analysis may suffer from collinearity issues, and that they are not always confident about placing a 'causal' interpretation on the results.

- Studies reviewed in Malecki (1987) were mixed in relation to the relative importance of location in to individuals. Ritti (1986) found that location ("Live in a location and community that is desirable to you and your family") ranked highest out of the aspect tested, whereas Business Week (1984) found that 'computer workers' ranked location as fifth most important factor – with "opportunity to learn new skills" the most important factor.

- Clarke (2017) reviews internal migration with the UK. As is shown in Figure 17 below, about 0.6% of employed individuals moved between UK regions (19 sub-regions/nations) in 2016, and this was below the 2001 peak of about 0.8%. However, since 2010, there appears to be a general upwards trend. The author goes on to show

that mobility has decreased for renters, younger people and graduates – those that are most likely to move for work.

Figure 17: Labour mobility in the UK



Source: Clarke (2017)

Perceptions and marketing

Related to the behavioural theory of firm relocation, and the above discussion of decision-maker characteristics, research has been conducted into the perceptions of individuals and the effects of marketing campaigns to change perceptions.

Hospers (2011) discussed 'place marketing', whereby a location is marketed to either individuals or companies. The paper recognises that a lot of attention is paid to the visual representation of locations, which is observable through media campaigns. However, it notes that previous evaluations of place marketing campaigns in Europe generally do not find a positive effect on the inward migration of individuals and firms (Young and Lever, 1997; Niedomysl, 2007; Pellenbarg and Meester, 2009).

Public policy

We note that public policy can influence many of the factors discussed above – in particular, market and non-market location factors such as transport infrastructure, health services, and education. Indeed, the two most important factors in site location decisions identified in KPMG (2016) were 'availability of skilled labour' and 'highway accessibility'.

However, in this section we briefly consider those factors that are 'directly' affected by public policy and that are not addressed above. In practice, these factors tend to relate to taxes and subsidies. More specifically, the literature identifies that such taxes/subsidies can affect the relocation decisions of firms, but that other factors are often more powerful drivers. For example:

- Whilst KPMG (2016) identifies availability of skill labour, access to highways, and quality of life as the most important factors in site location choices, corporate tax rates and 'state and local incentives' rank 7th and 11th. The paper also identifies environmental and employment regulations as factors that could affect location choices.
- Rabino (1989) looks at the factors influencing the relocation of R&D facilities from the US to foreign regions in 1984. The author found that factors such as political stability and availability of skilled workers were more important relocation drivers than tax incentives.
- Conroy et al. (2015) found that both tax rates and government spending on services affected the location choice of US manufacturing firms in the period 2000 to 2011 – although the effects varied by type of firm. For example, it was found that firms with a high intensity of R&D tended to migrate to states with lower rates of corporate income taxes, and higher property taxes.
- Bloom and Griffith (2001) studies the internationalisation of R&D between 1979 and 1997. The paper finds a positive relationship between the amount of R&D conducted in one country and the price (including tax effects) in another competitor country. The paper also estimates the domestic user cost of R&D is negative and statistically significant with an impact elasticity of around 0.14.

5. Evidence from interviews

This chapter of our report presents the results of the interviews we have conducted with 32 firms and 8 other stakeholders.

In summary, we find that:

- There is often **a number of contributing factors to a firm's choice to relocate**. **Expansion** and the **proximity to customers** are common 'primary' factors, but other site-specific factors such as the accessibility for staff, the condition of the property and lease conditions can contribute to the choice to move. Other reasons why firms choose to move a site or establish a new one include the costs of a particular location, consolidation, and establishing a new headquarters after a merger. There was no discernible pattern in terms of the reason to relocate across firms of different industries or sizes.

- In terms of the choice of **where to relocate to**, the firms that we spoke to overall placed greatest importance on **access to transport**. It was important to most companies in terms of staff being able to get to and from work easily. Transport was important for some manufacturing companies to transport their products, and it was important for some services firms for customer access. The importance of national versus local transport infrastructure depended on the geographic area that the company served.

- **Proximity to customers** was also a factor identified by many as of high importance to the choice of location. Being able to visit, and be visited by, customers was highly valued by firms from all sectors.

- For firms that were relocating production units, **proximity to the original site was important for retaining staff**, and staff retention was likely to be more important for companies that require staff to have a high degree of job-specific human capital.

- The **personal preference of key decision makers** affected the choice of area for smaller companies more often. Proximity to the owner's house was the key factor. Larger businesses appear to make more 'objective' choices in relation to the area, but personal preferences still affected the choice of the specific site.

- Whilst a proportion of the firms considered the overall **quality of life for staff** in different areas, the focus was on the **amenities in the immediate locality**. This included both small and large firms, and those relocating over short and long distances. 'Softer' factors were more commonly mentioned by firms requiring highly skilled labour.

- The **reputation of an area** was also identified as a key factor for some firms – in particular, those that were frequently visited by clients and customers.

- A more **formal decision-making process** was adopted by the larger organisations that we spoke to. Typically, a team of individuals from across the business was put together, with the ultimate decision being down to the CEO or chairman.
- Some firms **consulted** with employees, in order to choose a location that would maximise retention. One large company had to negotiate with local residents to ensure planning permission was secured.

Table 5 below specifies how the importance of factors in the choice of location appear to vary by a selection of firm characteristics, based on our interviews.

Table 5: Variation in driver of location choice by firm characteristics

Firm characteristic	Relative importance of drivers of location choice
Size	• Personal preferences of key decision makers more important for smaller companies (e.g. location of owner's house). • Proximity to original location more important for smaller, single-site firms (in order to maximise staff retention).
Industry	• Quality of life (particularly availability of local amenities and cultural hub) and reputation of an area more important for professional services than manufacturing firms. • Transport for haulage purposes more important for manufacturing firms (but transport important for all industries).
Job-specific human capital	• Proximity to origin location more important for firms that employ staff with a large degree of job-specific human capital (in order to maximise staff retention).
Geographic market served	• National transport infrastructure more important for firms that serve national or international markets.
Foreign or domestic ownership	• No clear differences were found between foreign and domestically owned companies.

The rest of this chapter contains the following main sections:

- Approach.
- Who we spoke to.

- Findings from interviews.

Approach

Our approach to interviews consisted of two elements, as follows.

- Interviews with 32 firms that have recently relocated – including both partial and complete relocations.
- Interviews with 8 other stakeholders that have knowledge of the decision-making process that firms go through when deciding to relocate, and insights on the overall trends of firm relocation in the UK market. These organisations consisted of: trade bodies; real estate service firms; head hunters; and academics.

Subsequent to identifying the relevant sample, we developed discussion guides that set out the questions we sought to ask in the interviews. There were two separate guides for firms and organisation, as follows.

- The discussion guide for interviews with firms was divided into four main parts: i) context, e.g. the nature of the business and size of employment; ii) main triggers / reasons for considering relocation; iii) decision-making process in terms of how the decision was made and what 'push' and 'pull' factors were considered; and iv) reflections on the decision and future plans.
- The discussion guide for interviews with organisations were tailored to the specific type of organisation that we spoke to. The main topics covered by the guides were: i) the relative importance of 'push' and 'pull' factors; ii) trends in relocations and relevant real-world case studies; iii) how do factors vary for firms of different size and in different industries; iv) how are the drivers of relocation changing over time; and vi) the main analytical challenges / gaps in the research (more relevant to academics). In general, the interviews were more open and discursive compared to the interviews with firms.

Our sample, which consists of firms that had been through a relocation in the last five years, was selected such that there is a spread among firms of different sizes and industries, but with a focus on: firms with 50 or more employees; in manufacturing, information technology or professional services industries; that relocated to a different town, city or local authority.

The sample of trade bodies and head hunters was selected based on our knowledge of the support provided by these organisations to firms. While the sample of real estate service firms was selected based on the interesting summary reports published by these firms that were identified as part of our literature review.

30 of the firm interviews were conducted by the market research firm Teamsearch, and two by Economic Insight. The 8 other stakeholders interviews were also conducted by

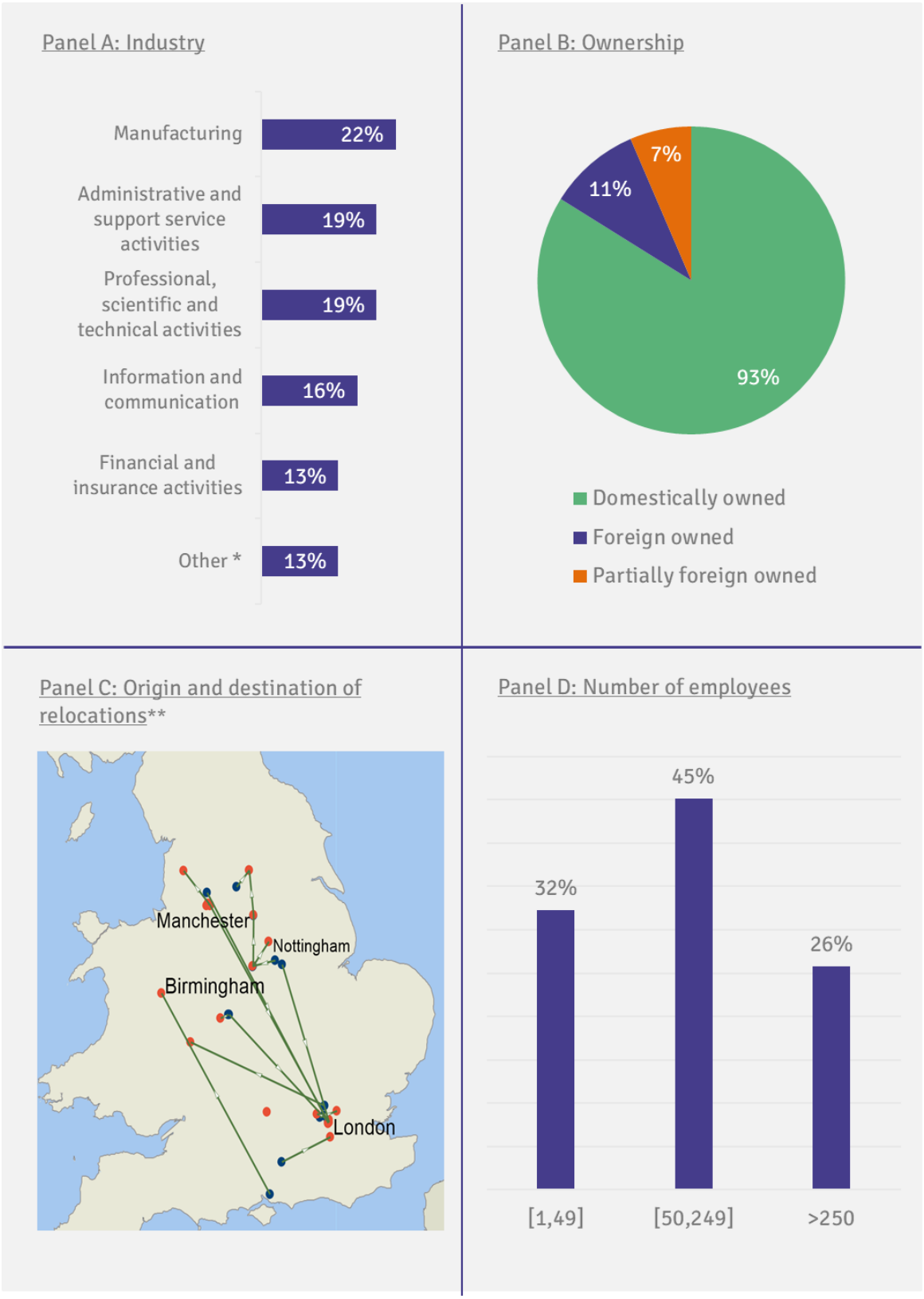
Economic Insight. Recruitment of organisations that we had a direct relationship with were approached through our contacts, and other organisations were contacted via email and asked whether someone from the organisation would be available for the interview. Academics were also contacted via email to ask whether they are available to participate in the research.

Interviews with firms and organisations were done over the phone, and each interview lasted between 30 minutes and one hour. Interviews took place between January and March 2018.

Who we spoke to

In the following Figure 18 we present a summary of the characteristics of the 32 firms that we spoke to. As can be seen, our sample consists of a spread across: industries; foreign ownership; relocation origin and destination; and size of firm.

Figure 18: Sample of firms[13]



[13] * Other industries include construction, retail, and mining. ** The orange dots show origin and blue dots show destination. Relocations over short distances are not visible. An orange dot that is not connected to a blue dot show expansion to a new market.

Table 6 below lists the type and name of the other stakeholders that we spoke to.

Table 6: Other stakeholders we spoke to

Type of organisation / individual	Name
Trade body	London Chamber of Commerce and Industry
Trade body	Greater Birmingham Chambers of Commerce
Trade body	West and North Yorkshire Chamber of Commerce
Real Estate Services	Gerald Eve
Real Estate Services	CBRE
Head Hunter	Chi Square Economics
Academic	Paul Greenhalgh
Academic	Pieter Pellenbarg

Findings from the interviews

The results of our firm interviews suggest that relocation decisions can be complex, multifaceted, and very specific to individual companies. This view was echoed by the other stakeholders we interviewed. Generalisations can be made across industries and firm sizes, but these can often be imperfect.

In the following section we summarise findings from the interviews. The analysis in this section covers the following:

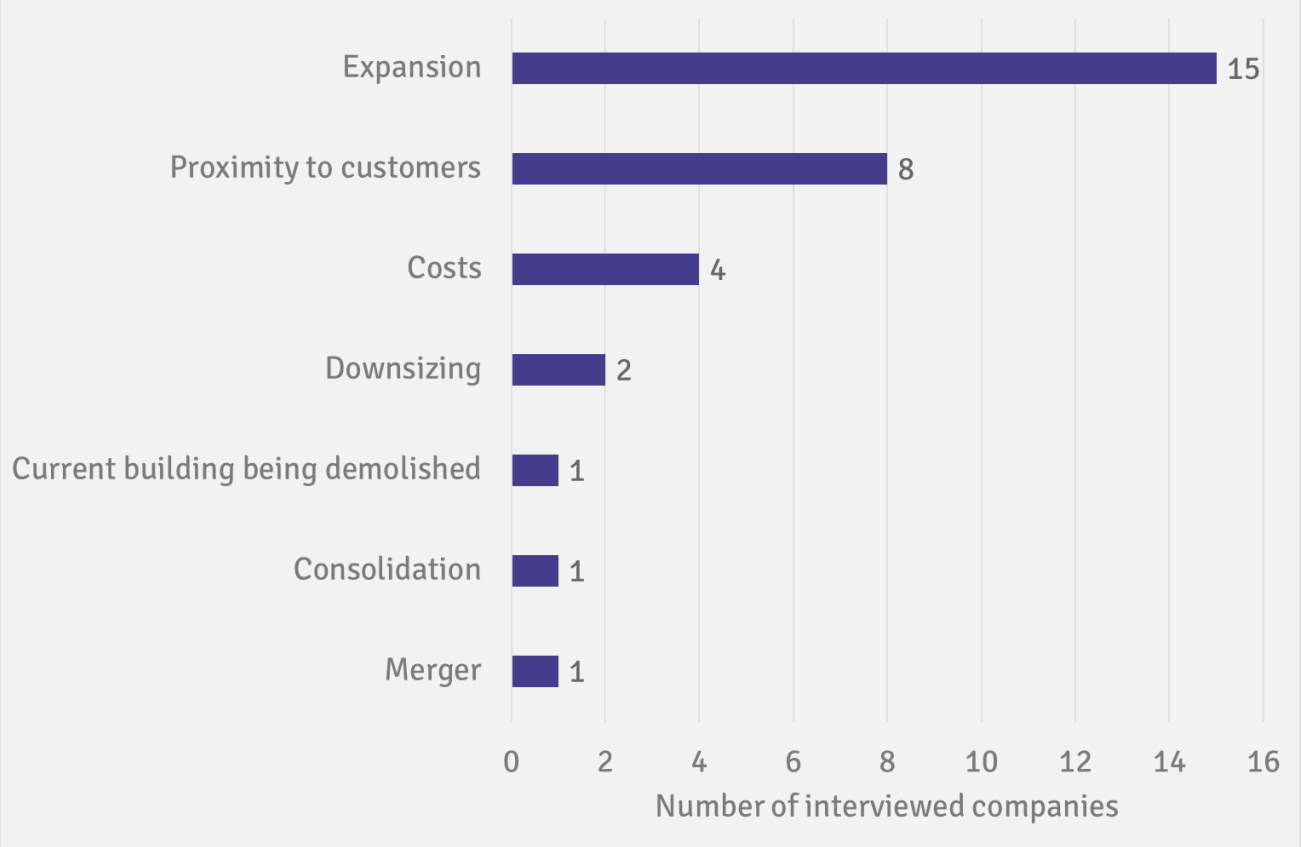
- Drivers of the decision to relocate.
- Drivers of the choice of location.
- The decision-making process.
- Success of relocations and future plans.
- Reflection of results from interviews on economic theories of firm relocation

The sections are structured around what we found from the firm interviews, and are supported with examples and more detailed case studies. In addition, in separate boxes, we discuss the related views of the other stakeholders we interviewed.

Drivers of the decision to relocate

As is shown in Figure 19 overleaf, the most common 'main' reason for relocation among the companies that we interviewed was expansion. However, in many cases companies cited multiple reasons for relocating. For example, whilst a company may have been expanding, the condition of an existing property and local transport issues may have also contributed to the decision to relocate. For evaluation purposes, we have categorised each firm into one of the main reasons as shown in Figure 19.

Figure 19: Main reason for relocation among the firms we interviewed



In the following sections we discuss some of these key relocation reasons, along with other aspects of the choice to relocate. In particular, we discuss:

- expansion and downsizing;
- proximity to customers;
- costs;
- local transport; and
- lease expiry.

Expansion and downsizing

Both 'achieved' and 'expected' expansions were given as reasons to relocate. That is, some firms said that they had 'outgrown' their existing premises, and therefore needed to relocate to a more spacious property; whereas others said that they were moving to facilitate future growth in the company.

Whereas some of the relocations due to expansion were 'pre-emptive', relocations because of declines in activity were 'reactive'. The two firms that said that they were relocating because they were downsizing had already experienced a significant decline in commercial activity.

Proximity to customers

The second most common main reason for relocation was that the current location was felt to be too far away from customers. Proximity to customers was stated as important for both firms that produce goods and services. Examples include:

- An events management company, which was increasingly gaining clients in London's West End, and felt that they could be better served by locating close by.
- A manufacturing company relocated from Huddersfield to Leeds because it was closer to its main clients.

As discussed later, proximity to customers is also an important factor in location choice.

The importance to proximity to customers is further illustrated by the following case study.

Case study 1: Importance of proximity to customers

Company Background

Industry: Services

Size: 200 employees

Turnover: £50m

Year move: 2015

Relocation activity: Angel (London) to Moorgate (London).

Additional details:

This firm provides technical advice to companies in the transport sector, including train and freight operating companies, and other similar services to companies "further up" the supply chain, including equipment manufacturers.

Its competitive advantage lies in its ability to bring together several players in the transport sector and beyond to help develop technical and policy solutions to safety and employee wellbeing issues.

Relocation background

Push factor/s:

The primary trigger was that the company's Board was concerned that its overheads were too high based on research it had commissioned from a "Big 4" management consultancy.

Another trigger was that the CEO was concerned that there had been a decline in networking activity in its HQ – which could ultimately undermine the company's competitive advantage – and the CEO considered that location could be causing the decline (or at least a move could help mitigate it).

Pull factor/s:

- Proximity to key customers.

Process & Decision maker/s:

The management team had informal discussions with key customers to better understand the attractiveness / practicality of different locations from their perspective. This further narrowed the choice to two options and in-depth negotiations took place.

Impact:

The move progressed very smoothly and two years later the notable outcomes have been: a reduction in property costs by around 20%; and an increase in networking activity, as measured by the number of visitors.

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	Medium
Proximity to current company location(s)	Low
Proximity to suppliers	Low
Proximity to customers	High
Access to transport	High
Availability of highly skilled labour	Medium
Personal preferences of key decision makers	Low
Quality of life for staff in the local area	Low

Costs

A number of companies we spoke to mentioned that the relatively high costs of an existing site were a contributing factor in their decision to relocate. For example:

- One medium-sized company undertook a review of its operations and decided that one of its sites, in south west England, was costing too much. It subsequently moved that production unit to Wales – which is close to another one of its sites. This meant that that the roles of individuals who didn't want to relocate could be filled by existing staff from the other site in Wales.
- A small recruitment company that had two sites in Manchester and London, saw that the costs of the Manchester office were not commercially sensible, and decided to consolidate the Manchester office with their headquarters in London where they could still serve the Manchester market, but at a lower cost.
- One market research company took the decision to relocate its operations from Birmingham city to Halesowen, due in part to the reductions in costs that it saw it would make due to the differences in rent between the two locations.

The following case study illustrates how relocating reduced the costs faced by one company.

Case study 2: Importance of international logistics costs

Company Background

Industry: Manufacturing and retail

Size: 32 employees

Turnover: £6m

Year move: 2010

Relocation activity: Wembley (London) to Tilbury (Essex).

Additional details:

The company exports machine parts to marine gold and gas companies. The company was established in 2005. It has 32 employees with two sites in the UK and one site in Ghana.

Relocation background

Push factor/s:

The main reason for the relocation was to provide more space for their growing business, in terms of staff, technology and storage. The company also wanted to reduce its costs. For example, the company developed closer working relationships with a local freight-forwarder. They reached an agreement to

undertake some activities (such as labelling) in the freight-forwarder's warehouse for a lower fee than it cost in storage near Wembley.

Pull factor/s:

The location's proximity to international logistics connections and the costs of using them. That is, Wembley was ideally located for transporting goods by air freight, given its proximity to Heathrow airport, whereas Tilbury is ideally located for transporting goods by sea freight.

"…we're now moving towards Tilbury and more of the sea freight and most companies are now using that because it's cheaper to sea freight."

Process & Decision maker/s:

The decision-making process took around four weeks from start to finish. Overall, the relocation was very successful. There were some unforeseen costs and benefits.

- There were unforeseen IT costs, which were related to the transfer of the company's existing servers.
- There were unforeseen social benefits in that staff have socialised more since moving to Tilbury.

Impact:

The move has allowed the company to expand and reduce its costs.

Rating of factors:

Factor	Rating
Local wage rates	High
Local commercial property prices	High
Proximity to current company location(s)	Low
Proximity to suppliers	Low
Proximity to customers	Low
Access to transport	Medium
Availability of highly skilled labour	Low
Personal preferences of key decision makers	Medium

Quality of life for staff in the local area	Low

The following case study also demonstrates how a relocation can reduce costs by increasing efficiency.

Case study 3: Importance of the behaviour and incentives of employees

Company Background

Industry: Services

Size: 120 employees

Turnover: Not disclosed

Year move: 2015

Relocation activity: Hampshire (South East) to Croydon (London).

Additional details:

The company offers independent financial advice to companies and individuals. It has over 120 employees with a head office in Surrey and 2 other sites.

Relocation background

Push factor/s:

The first reason for the relocation was to reduce costs and increase space.

The second reason for the relocation was to help improve staff efficiency and control. It was felt that running a site from a distance had created several challenges relating to the management of staff and missing business opportunities.

The challenges relating to the management of staff were connected with managing what work was being done by whom and managing costs, including "staff politics". Further, it was felt that business opportunities were being missed:

- *"If you're in the same office, you can sometimes cross-reference each other and say 'I'm going to do this so can you recommend that?'".*
- *"It was as is if they were completely working on their own and then we tried to put systems in place with information being shared, but it wasn't being shared*

and we were just looking more and more unprofessional, and things were being lost in the net."

Pull factor/s:

- Proximity to customers.
- Good transportation links in Croydon. "*East Croydon has expanded its train station so there are train stations at both ends of Croydon now which makes it easier for people to come out of the station and walk straight to our office and that wasn't the case before."*

Process & Decision maker/s:

The decision-making process took around 1 month from start to finish. It was the Board of Directors that were responsible for making the decision, and the company received support from estate agents.

Impact:

The relocation has been successful. The team is interacting, the management team has control, and the work is profitable.

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	Medium
Proximity to current company location(s)	High
Proximity to suppliers	Low
Proximity to customers	Medium
Access to transport	High
Availability of highly skilled labour	Medium
Personal preferences of key decision makers	High
Quality of life for staff in the local area	Medium

Local transport

The ease of access to sites (for staff, customers, and suppliers) was often cited as a contributing factor in the decision to relocate. None of the companies that we spoke to moved solely because of local transport issues, but a number mentioned it as one of the factors that 'pushed' them away from their current site. The most frequently mentioned transport issues were lack of adequate parking and traffic congestion.

As is illustrated by the case study below, localised factors such as parking can contribute to a firm choosing to relocate to another site much further away.

Case study 4: Importance of local infrastructure

Company Background

Industry: Services

Size: 100 employees

Turnover: £6m

Year move: 2018

Relocation activity: Sheffield (Yorkshire) to Derby (East Midlands).

Additional details:

The company is a recruitment company, specialising in recruiting HGV drivers for the logistics industry, including for companies such as DHL. The company was founded in 2006 by two people and is looking to increase it to £25m over the next decade.

The company currently has a head office in Derby. The company has 13 other sites.

Relocation background

Push factor/s:

- The main reason for the relocation was to help facilitate the company's expansion, both to accommodate more staff in its head office, and to provide a new local presence in Derby.
- The "push" factors from Sheffield were that rent in the city centre was expensive and parking was difficult for staff.

Pull factor/s:

- The “pull” factors of Derby were that the company wanted to establish a local presence there anyway, and also that they found an office that the company could afford to purchase and (potentially) rent out in future if they outgrew it.

Process & Decision maker/s:

The decision-making process took around 6 months from start to finish.

Impact:

It is too early to say.

Rating of factors:

Factor	Rating
Local wage rates	High
Local commercial property prices	Medium
Proximity to current company location(s)	High
Proximity to suppliers	Medium
Proximity to customers	Medium
Access to transport	High
Availability of highly skilled labour	High
Personal preferences of key decision makers	Medium
Quality of life for staff in the local area	Medium

Lease expiry

Whilst the factors discussed above were given as reasons for relocation, two interviewees noted that the consideration of relocation was triggered by the expiry of a lease.

- One interviewed company that had around 120 employees in the financial services industry was operating out of two sites, but staff were spending a lot of time moving between them. When the lease came up for renewal, the potential for combining the sites was raised, and it was decided to relocate the operations of one to the other.

- Another interviewed company was facing capacity constraints and experiencing issues with local traffic congestion. When the lease came to an end, the company took the opportunity and relocated to a larger property with better access.

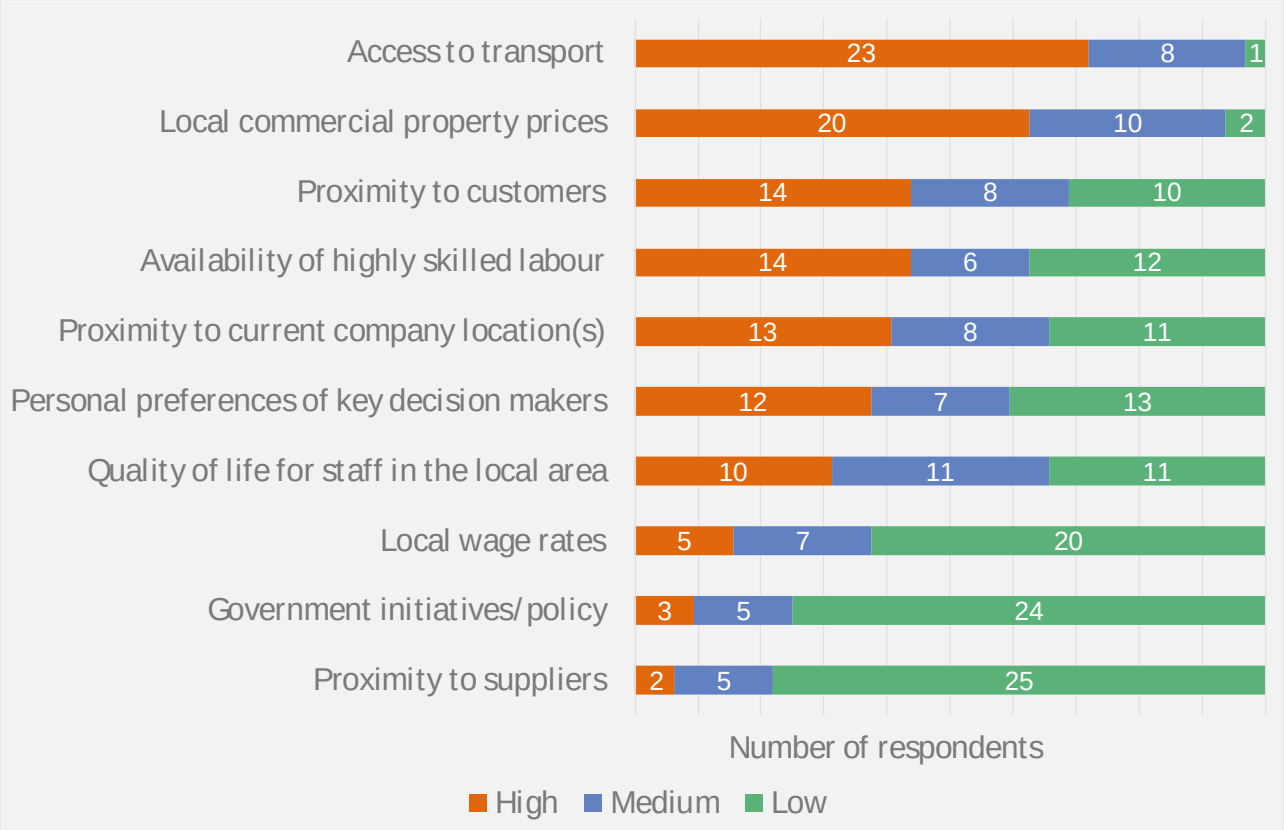
Relatedly, another respondent noted that although their company had already made the decision to relocate, they had to wait until the lease expired to actually move.

Drivers of the choice of location

Similarly to the choice to relocate, the drivers of the choice of location are varied and complex. Firms reported considering a range of different factors when choosing between locations. From those that we spoke to, it was clear that factors related to both the individual site and the local area were important in their decision.

We asked each firm interviewee to assign importance ratings to 10 different factors that may have affected their choice of location, and the Figure 20 below shows the results of these questions. We discuss each of the factors in the subsequent sections, along with the importance of reputation and agglomeration, which were other factors identified by a number of respondents.

Figure 20: Relative importance of factors among the firms we interviewed



Transport

As can be seen in Figure 20 above, access to transport was the factor most frequently rated as 'high' by the companies that we spoke to. It was important to most companies in terms of staff being able to get to and from work easily and without delay. Transport was also important, depending on the nature of the business, for customer access and moving manufactured products to customers or retail outlets. There was also variation in the

importance of national and local transport, depending on where customers, staff and goods are travelling to and from.

Examples of what we heard include:

- One mining company, that resulted from a merger between a Spanish and an American company, located its headquarters in London because it has good transport links to from both Spain and the US. Access to airport was particularly important.
- One large manufacturing and retail company relocated its operations to London, from Bury, as it allowed for greater access to transportation links – including airports and international railways such as Eurostar, which in turn made it more convenient to reach both suppliers and customers.
- One manufacturing company with around 50 employees chose its new site partly because of access to multiple motorways.
- A number of companies noted that the road access and staff/customer parking was a key feature of their chosen site.

The following case study further illustrates the importance of national infrastructure.

Case study 5: Importance of national infrastructure

Company Background

Industry: Services

Size: 60 employees

Turnover: £1m

Year move: 2018

Relocation activity: new office in Preston (North West).

Additional details:

The firm is a financial advisory company. The company was founded eight years ago, though its history dates back to the 1970s. It currently employs 18 people on a full-time basis, and up to 50 to 60 people on a part-time basis.

The company currently has 2 sites located in Manchester city centre and Preston. They opened the Preston office earlier this year.

Relocation background

Push factor/s:

The main reason for opening the Preston office was to access cheaper office and warehouse space (the company estimated that space was around 45% cheaper per square foot in Preston compared to Manchester city centre).

Pull factor/s:

Improving access to the M6 was important because a lot of the company's contacts were based in the North, and meetings that required travel into or out of Manchester city centre had become frustrating due to traffic congestion.

"…we wanted to bring them in for a briefing…but the logistics of getting 12 people coming to the office at a certain time…led us to think 'You know what'? We're missing a trick here…let's move where these people need to be."

Process & Decision maker/s:

The decision-making process took around 3 months from start to finish, without any unforeseen challenges or costs.

Impact:

The Preston office has achieved its objectives – the frustrations have fallen *"The staff guys we've got working out on the road have got smiles on their faces because they're not stuck in our traffic in the city centres".*

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	High
Proximity to current company location(s)	Medium
Proximity to suppliers	Low
Proximity to customers	Low
Access to transport	High
Availability of highly skilled labour	Low
Personal preferences of key decision makers	High
Quality of life for staff in the local area	Low

View from other stakeholders: transport

A few stakeholders that we spoke to also noted that they expect HS2 to have an impact on firm relocations – in particular, making the areas immediately around the stations more appealing due to increased connectivity with the rest of the UK.

It was also noted that Birmingham city centre has benefited from the recent redevelopment around New Street Station. In addition to it being a transport hub, the redevelopment has improved the reputation and 'feel' of the area.

Local commercial property prices

Commercial property prices were generally seen as of high importance to the companies that we spoke to. This may partly reflect the fact that companies are likely to have considered a range of properties that differed in price.

gives an example of how commercial property prices can affect a relocation decision. Another company we spoke to moved from Birmingham city centre to Halesowen, partly because of lower rental costs.

However, some companies were less 'price sensitive'. One large IT company that we spoke to, which relocated from Birmingham to London, recognised that it was moving to a more expensive area, but that it was "worth the cost" because it allowed for better access to both clients and talent pools.

Proximity to customers

For a number of the companies we spoke to, the area they decided to move to was chosen because of its proximity to customers. Examples of firms we spoke to include the following.

- A recruitment consultancy firm opened a new branch in Manchester to reach new clients. It already had an office in Leeds, but thought that it could better serve new clients in the North East from Manchester.
- A medium-sized events management company moved from Watford to London's West End in order to be closer to its key customers.
- A large construction in the utilities sector firm moved from south Nottinghamshire to Derbyshire to be closer to a major client. Proximity was important because the firm has to provide on-site support when there are system faults.
- A packaging manufacturer moved from Huddersfield to Leeds, where most of its biggest customers were located.

The following case study further illustrates the importance of proximity to customers.

Case study 6: Importance of co location with customers

Company Background

Industry: Construction

Size: 60 employees

Turnover: £5m

Year move: 2013

Relocation activity: Sheffield (Yorkshire) to Leeds (Yorkshire).

Additional details:

The firm is a construction company, which upgrades, repairs, refurbishes and develops social housing stock. It specialises in disability adaptations. The company was established in 2008.

The firm currently has a head office in Leeds, which it opened around 5 years ago, having moved from Sheffield.

Relocation background

Push factor/s:

- Lease termination.

Pull factor/s:

The main reason for moving from Sheffield to Leeds was that *"everything had become more Leeds focused"*, with an increasing number of the company's customers and suppliers being located in the *"financial capital of the North"*.

Process & Decision maker/s:

The decision-making process took around 6 months from start to finish, without any unforeseen challenges or costs.

Impact:

The business has grown and the working environment is much better, and travel times have fallen for both customers and staff.

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	High
Proximity to current company location(s)	Low
Proximity to suppliers	Low
Proximity to customers	Medium
Access to transport	Low
Availability of highly skilled labour	Low
Personal preferences of key decision makers	High
Quality of life for staff in the local area	Low

Availability of skilled labour

The reported importance of the availability of skilled labour was mixed among the companies that we spoke to. Some companies did not view there being considerable differences across locations they were considering, in terms of the labour input they require.

Furthermore, the majority of companies that we spoke to did not need to hire a large number of new staff at their new site. Many of the companies retained a large proportion of staff from the original site, or were co-locating / consolidating to a location in which existing staff could be used. Indeed, some companies' decision sets were limited to locations that existing staff would be willing to commute to.

Examples where skilled labour was stated as important include the following.

- A high-end clothing manufacturer and retailer that we spoke to said that they opened a new office in London partly because there was a lack of suitable staff where the company was based.
- A small recruitment consultancy which opened a new office in Manchester was attracted to the city partly because of the graduate talent pool.
- A global IT company, which relocated one of its offices from Birmingham to London, was attracted by, among other factors, the "young, fresh, dynamic kind of staff" available in central London. Furthermore, it valued the skilled labour that it could access on a consultancy basis, including brand awareness, IT, marketing and R&D consultants.

View from other stakeholders: skilled labour

Related to the above, one of the other stakeholders that we interviewed thought that graduates were increasingly staying in the city that they went to university in. This meant that university cities were now even more attractive to businesses requiring graduate-level skills.[14]

Proximity to current company location(s)

The proximity of the new site to current company locations (both the 'origin' site and other sites) was very important for those that wished to retain a large proportion of their staff. This tended to be single-site companies, or multi-site companies that were 'moving' a production unit, rather than opening a new one. Retention of staff also appeared more important for smaller companies. As is discussed further later, some firms consulted with existing employees to ensure that the new locations were within reasonable commuting distance.

Proximity to current locations was also an important factor for a manufacturer that we spoke to that had bricks-and-mortar retail operations. The multinational company had retail outlets in Manchester and London, and valued being located in the Midlands – part way between the two. This allows it to transport its manufactured goods, by road, to the outlets at relatively low cost fairly quickly.

View from other stakeholders: proximity to current location

We heard from one stakeholder that retention of staff is most important in businesses that have a high degree of job-specific human capital. The two following examples were given.

- A medium-sized manufacturing firm that had been operating in the North of England for many years employed staff that had intricate knowledge and understanding of the production processes used. The company was located in an area that was sub-optimal in terms of available space and transport links. However, it was limited in the choice of destinations it could relocate to because it believed it would collapse if a large proportion of staff were not willing to relocate with it.

- An international manufacturing and retail company was able to move some of its back office operations out of London, because the skilled accountants and

[14] We have not been able to identify any further evidence to support or reject the hypothesis or changing graduate 'retention' rates.

Personal preferences of key decision makers

It was clear that many of the relocation decisions that we discussed with firms involved a high degree of judgement. That is, there may have been a number of suitable destinations, but no single obvious 'best' destination – and as such, key decision makers had to rely on their 'subjective' evaluation of the options. Some respondents therefore gave a 'high' rating to the importance of personal preferences of key decision makers.

In relation to personal preferences that are not directly related to the commercial success of a business, larger companies that we spoke to gave responses consistent with the location choice being "purely a business decision". However, where the key decision makers lived was a key factor for owner-operated and smaller businesses. For example:

- One managing director, of a company with over 60 employees, stated that his personal preferences were very important in the choice of the company's location – he "had had enough of travelling" to the old site (the company moved to closer to where he lived).
- A director of a small manufacturing company noted that his personal preferences had a role to play in the location choice of the company: "I have sort of my own agenda in the fact that it is now five minutes from my house. Whenever I had to go in before I had an hour's drive and now I don't."

In addition to being important in the choice of area, personal preferences also played a role in the choice of specific site. One respondent stated that "the view from his [the owner's] office window was a factor".

The following case study illustrates the importance of the subjective decision-making process, and personal benefits that can be related to a relocation decision.

Case study 7: Importance of the attitudes / preferences of decision makers

Company Background

Industry: Services

Size: 30 employees

Turnover: £2m

Year move: 2018

Relocation activity: Fitzrovia (London) to Camden (London).

Additional details:

The company provides civil engineering services (transport assessments and engineering drawings) to private sector clients. The company was established in 2012. It has 30 employees with a head office in Birmingham and 4 other sites, and plans to grow to 50 employees over the next 5 years.

Relocation background

Push factor/s:

The main reason for the relocation was to accommodate company growth. The location decision followed the managing director attending a business development course which had focused on growth. The management team rewrote its business plan, which included an aspiration for company growth, and thus identified a need for more office space.

Pull factor/s:

- Cheaper rents.

Process & Decision maker/s:

The decision-making process took around 3 months from start to finish. The managing director made a decision based on "gut feel" and prices, noting that the prices in Fitzrovia were too high to pay for the larger amount of space they need to deliver their new business plan. One benefit of the move is that one of the management team can now bring his dog to work!

"I am a decisive person rather than indecisive, once I'd written the business plan and said that's all we need to do, rather than sit round and think about it for eight months, we just went ahead and did it and moved within two months…".

Impact:

The move has been successful and the company expects that it will move again to accommodate further growth.

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	High
Proximity to current company location(s)	Medium
Proximity to suppliers	Low
Proximity to customers	Low
Access to transport	High
Availability of highly skilled labour	Medium
Personal preferences of key decision makers	High
Quality of life for staff in the local area	High

Quality of life for staff in the local area

The companies that we spoke to generally did not consider the overall quality of life for staff in the local area in making their relocation decisions. They did, however, consider very site-specific factors such as the presence of shops, restaurants, bars and cultural centres. Such 'softer' factors were more frequently mentioned by firms that employed more highly skilled labour (typically professional services firms, rather than manufacturing firms).

Examples of what companies considered include the following.

- One professional services company that consolidated a number of sites from across the country to central London valued the available amenities – "It's not just food, it's services as well. We network with a lot of the businesses to provide services like laundry and things like that, and it is just nearby because in Old Street you have all of the culture of tech industries and the like, and they need everything done for them, so you have a lot of businesses that set up just to service us and that is one massive thing."

- A multinational company that chose to house its headquarters in London was attracted by the restaurants and hotels that senior management could use when visiting the office – "we're five minutes away from Oxford Street, so near all the shops and in Mayfair there are lots of very high-end restaurants and hotels and so if and when we have management meetings or board meetings, this is where the board are put (in the hotels in the surrounding area) and then they all go to the restaurants afterwards."

- A small technology company, based in Manchester, that opened a new office in Hampshire, considered the local schools. However, the managing director felt he did not give this enough attention in retrospect. Had he known that certain members of staff would relocate to the new office, he would have put more effort into looking at local schools.

View from other stakeholders: quality of life

Several stakeholders mentioned quality of life and the quality of the public realm as important considerations for firms in choosing where to relocate to. In particular, quality of public domain includes factors such as clean streets, and spacious green areas, whereas quality of life also encompasses aspects such as affordable housing. In general, stakeholders saw the quality of life as one of the driving factors for firms relocating out of London and into other major UK cities.

Local wage rates

The local wage rate was not a major factor in firms' choices of location as it was not perceived to vary considerably between the locations firms were considering – both within regions and across the whole UK.

- One respondent from the manufacturing sector noted that if they had considered international destinations, local wage rates would have been a key factor, but the company was only considering UK sites.
- One recruitment consultancy which opened a new office in Sheffield considered the local wage rate in other cities such as Lincoln, and Luton.
- A few professional services companies noted that they were moving to higher wage areas, but that they were willing to pay more for better access to skilled labour or proximity to customers.

Government initiatives/policy

A few firms noted the importance of government initiatives and policy. A multinational company that relocated an office from Birmingham to London said that local government or economic development body's economic strategy "probably played maybe 15% in the decision-making process". This was because the company considered how the working relationship would be between themselves and local organisations, on matters such as recycling, the environment, and traffic.

However, on the whole, companies did not report being affected by public policy. Furthermore, they did not generally appear to be aware of the support available to them from public sector organisations, or the policies designed to help them. As such, it could

be that firm behaviour is affected by targeted policies, but there is a lack of awareness among companies about the effect of policies.

The case study below highlights how the role government can play an important part in the relocation decisions of firms.

Case study 8: Importance of government support

Company Background

Industry: Global manufacturer and retailer of purpose-built taxis

Size: 750 employees

Sites: TBA

Turnover: £60m

Year move: 2015 (year decided to move)

Relocation activity: Holyhead road (West Midlands) to Ansty (West Midlands).

Additional details:

In 2013, a Chinese multinational automotive manufacturer rescued the company from administration. This also marked the start of a new business strategy for the firm, in which it will focus on developing electric vehicles and broaden its target markets.

This marked the largest ever greenfield investment in the UK by a Chinese company, and was backed with funding from the UK government's Regional Growth Fund and other UK and local government support.

The new electric vehicles are manufactured with significantly increased UK and EU content. Whereas the previous model was built with 80-90% of components from China, the new model is built with about a third of components coming from the UK, a third from the rest of Europe, and a third from the rest of the world.

Relocation background

Push factor/s:

The reason for the relocation was to facilitate the firm's new business strategy, and in particular the development and manufacture of the new TX model. The Holyhead Road site, where the company had been for almost 70 years, had limited opportunities for expansion, faced transport constraints, and was not suitable to meet the company's growing demands.

Pull factor/s:

In 2015, the Chinese manufacturer announced a £250m investment to build a new state-of-the-art research, development and assembly facility for the firm in Ansty, Coventry. The 85,000 sq metre site now houses all of the company's research, development and assembly operations, and has the capacity to increase production by 10 times that of the company's previous site in Holyhead Road, Coventry.

There were several reasons why the Ansty site was chosen.

- Retention of staff was seen as a critical factor. The new site is roughly 7 miles away from the old one, and therefore retention was expected to be high.
- The area has a strong skills base. This is supported by a history of automotive manufacturing, top universities and R&D facilities – including, for example, the Manufacturing Technology Centre (MTC).
- The site has good access to motorways, which is important for suppliers. Furthermore, it is roughly half way between the firm's two UK showrooms in London and Manchester.
- The company wanted to maintain its heritage and history, and it was important from a brand perspective that manufacturing remained in the UK.

Process & Decision maker/s:

A working group was set up internally to consider different sites. To identify and evaluate different options, the company received support from real estate services firms and the government. Sites from across the country were considered, including in London, South Wales, and the Midlands. The CEO and CFO were heavily involved in the decision-making process, and the chairman was responsible for the final decision.

Impact:

The move is seen by the company as very successful. There were some delays related to environmental regulations, but overall the project was seen to be executed well. There was a very high retention rate, and the firm expects to continue to increase its operations at the site in the coming years.

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	Medium
Proximity to current company location(s)	Medium
Proximity to suppliers	High
Proximity to customers	Medium
Access to transport	High
Availability of highly skilled labour	High
Personal preferences of key decision makers	Low
Quality of life for staff in the local area	Medium

Proximity to suppliers

The proximity of a location to suppliers was generally seen as of low importance. This was because inputs were generally seen to be transportable with relative ease. However, the importance of proximity to suppliers could also be a function of the product being delivered. For example, in one case where the input for the firm was food, it was noted that the firm had relocated, in part, to achieve more reliable deliveries of the input – in their previous city centre location deliveries were getting stuck in traffic.

Reputation of area

In addition to the factors explicitly asked about, the reputation of an area was identified by a number of firms that we spoke to as an important factor in their choice of location. Such firms tended to be those that were frequently visited by clients and customers. Multinational companies appeared to favour having a presence in London, or another 'world-renowned' city.

For example:

- A recruitment consultancy, that moved out of a city centre, wanted to "upgrade to a much more corporate area". One aspect it wanted was a dedicated entrance for its clients.
- For a medium-sized finance company that relocated from the East Midlands to the West Midlands, reputation was "one of the top criteria" in their decision-making process.
- One multinational company wanted its headquarters to have a particular central London postcode.

The importance of the reputation of an area is further illustrated by the case study below.

Case study 9: Importance of a city's international reputation

Company Background

Industry: Services

Size: 200 employees

Turnover: £40m

Year move: 2017

Relocation activity: new office in Oxford (South East).

Additional details:

The company is a corporate advisory firm, providing business owners with creative, value-maximising solutions for growing and exiting their businesses. The company employs over 200 personnel, with locations across the globe including the UK, South Africa, Europe, and the US.

The company currently has two fully managed sites in the UK, located in Manchester and Oxford. It has recently opened its site in Oxford, relocating part of its resources from Manchester, in addition to growing its corporate finance team.

Relocation background

Push factor/s:

Not applicable as it is opening of a new office.

Pull factor/s:

The main reason for opening the Oxford office was to help service the company's clients in the South, improving the experience of clients by being in closer proximity to them, ensuring an inclusive and collaborative process.

Process & Decision maker/s:

The decision-making process took around 12 months from start to finish, without any unforeseen challenges or costs.

Impact:

The opening of the Oxford office has been very successful, particularly as the 'Oxford' brand is recognisable internationally because of its infrastructure and

world-class University, helping to continue Benchmark International's establishment worldwide.

Rating of factors:

Agglomeration / clusters

Agglomeration / clusters of firms that belong to the same industry was another factor mentioned by some firms as an attractive feature of the location that they chose to relocate to.

- A large information technology company has relocated to London, from Birmingham, and noted the great advantage in being close to companies like Microsoft and Google. They described their movement to London as part of their plan in being 'at the heart of the action'. Being in London allowed the firm a greater access to the talent pool, and allowed them to be closer to business partners and other 'potential' business partners.
- A small recruitment agency for architects and designers initially had two offices in Manchester and London, but decided to close the office in Manchester and expand its London office in Farringdon – which it noted is the 'design district in London' and where all the designers are located.

View from other stakeholders: agglomeration of businesses

We have heard from other stakeholders that clusters of businesses are common and are an important factor in attracting business.

- One stakeholder mentioned that clusters usually form where there are connections with universities that supply graduates.
- Another stakeholder described the growing cluster of professional services in Birmingham as a 'multiplier effect'.

The decision-making process

The decision-making process that companies go through to reach a decision on relocation varies by the size and structure of the firm. In our interviews with firms we had discussions on who gets involved in the process; what support do firms get during the research process; and the various consultations they have with employees, suppliers, and the government. In the following we highlight key findings from the interviews.

Who was involved in the process

In the majority of cases, the owner and the managing directors of the company that we spoke to made the decision on whether to relocate and where to relocate to. The involvement also depended on the structure of the firm.

- One large company that relocated from Birmingham to London had a team made up of the Managing Director, Facilities Director, Office Manager, Operations Director and the IT Director to manage the relocation process.
- One company that had a foreign partner kept them informed but they were not actually involved in the process itself. Finding a suitable place and overseeing the relocation of the site that had around 54 employees was the responsibility of the Commercial and the Managing Directors in the firm.
- For another, owner-manged firm, the two directors were responsible for the whole relocation decision-making process.

Research process and external support

In general, the decision-making process was divided into two main stages – the first was internal research and collection of data on, for example, areas with transport links that were at good proximity from employees, and the second stage was taking forward these requirements and seeking external support to help meet them, usually from real estate agents.

- One large company with more than 4,000 employees had a formal research process in place where the project management team was delegated to analyse costs in different regions of the UK, give an estimate of the space required, and of installation costs. Additionally, the company used the external support of building surveyors, lawyers, and

real estate agents, to ensure the relocation process proceeds smoothly and that the 'right' location was found for the firm.

- Another smaller company that moved from Wembley to Essex, due to expansion plans, relied on the owner's knowledge of areas and the advice they were given from people and friends about different areas in their decision-making process.

However, not all firms undertook their own research, and some relied more heavily on external support. The case study below illustrates the importance of support from real estate services firms in firm's location choice.

Case study 10: Importance of support from real estate services firms

Company Background

Industry: Services

Size: 50employees

Turnover: £750,000

Year move: 2018

Relocation activity: Birmingham (West Midlands) to Halesowen (West Midlands).

Additional details:

The company provides market research services to large food manufacturers. Established in 2015.

Relocation background

Push factor/s:

The reason for relocation was twofold: the cost of renting commercial premises; and transport for staff. The company was looking to lower its rental costs and considered a range of different areas within the West Midlands. It was getting harder for staff to get to work because of traffic congestion in the city centre.

Pull factor/s:

- Lower input prices.
- Familiarity with the area.

Process & Decision maker/s:

The decision-making process took around four months from start to finish. The company mainly relied on a real estate services company to identify and evaluate different locations and properties. The directors of the company provided a brief to the real estate services firm, which subsequently identified three options along with a summary of pros and cons. The directors valued the expertise and knowledge of the real estate services firm because they were not familiar with the characteristics of the different areas being considered.

Impact:

The relocation was seen as very successful. Staff are able to get to work more easily, and on time.

Rating of factors:

Factor	Rating
Local wage rates	Low
Local commercial property prices	High
Proximity to current company location(s)	Medium
Proximity to suppliers	Low
Proximity to customers	Low
Access to transport	Medium
Availability of highly skilled labour	Low
Personal preferences of key decision makers	Low
Quality of life for staff in the local area	Low

Consultations with employees, suppliers, and the government

The degree of consultations and negotiations that firms that we spoke to had with stakeholders appeared to be a function of their size, their stage of development, and the distance of relocation.

- One company in the professional services industry that opened a new site had to provide some of their employees incentives in the form of promotions to encourage them to move to the new branch.
- One large company was required to go through negotiations with the residents of the neighbourhood in which they wanted to relocate to ensure them that new jobs would be

available and that their projects will not change the area, in order to get their planning permission.

- In the case of one company with 50 employees that relocated within the West Midlands region, there were no negotiations with employees or customers as they did not feel that the relocation would make a difference to any of their stakeholders.

Success of relocations and future plans

In the final part of the interview we asked firms to reflect on the success of their relocation process and to comment on their future plans. In general, firms indicated that the relocation was a success and that they see it as a 'plus' to the firm. We also asked firms how they see the importance of factors driving relocation changing in the future. The majority of respondents believe that the relative importance of factors will not change over time, however, some saw that certain factors will have more weight in the decision-making process, as follows.

- The changing structure of the working environment and the fact that more people are working from home – which means that firms will need less office space. Accordingly, it might be the case that space would be less of a pressing factor / driver for relocation in the future.
- The high reliance on internet connections, and the importance of being in an area with *high* connection speeds. As some businesses are increasingly reliant on internet connections in providing their services, access to reliant and high-speed networks will have a large weight when choosing a location to move to.
- Having access to reliable transportation links with decreasing travel times, especially given the perception of increasing traffic. The 'quality' of transportation would be an increasingly important factor / consideration over and above its mere availability in the future.

View from other stakeholders: future of relocation factors

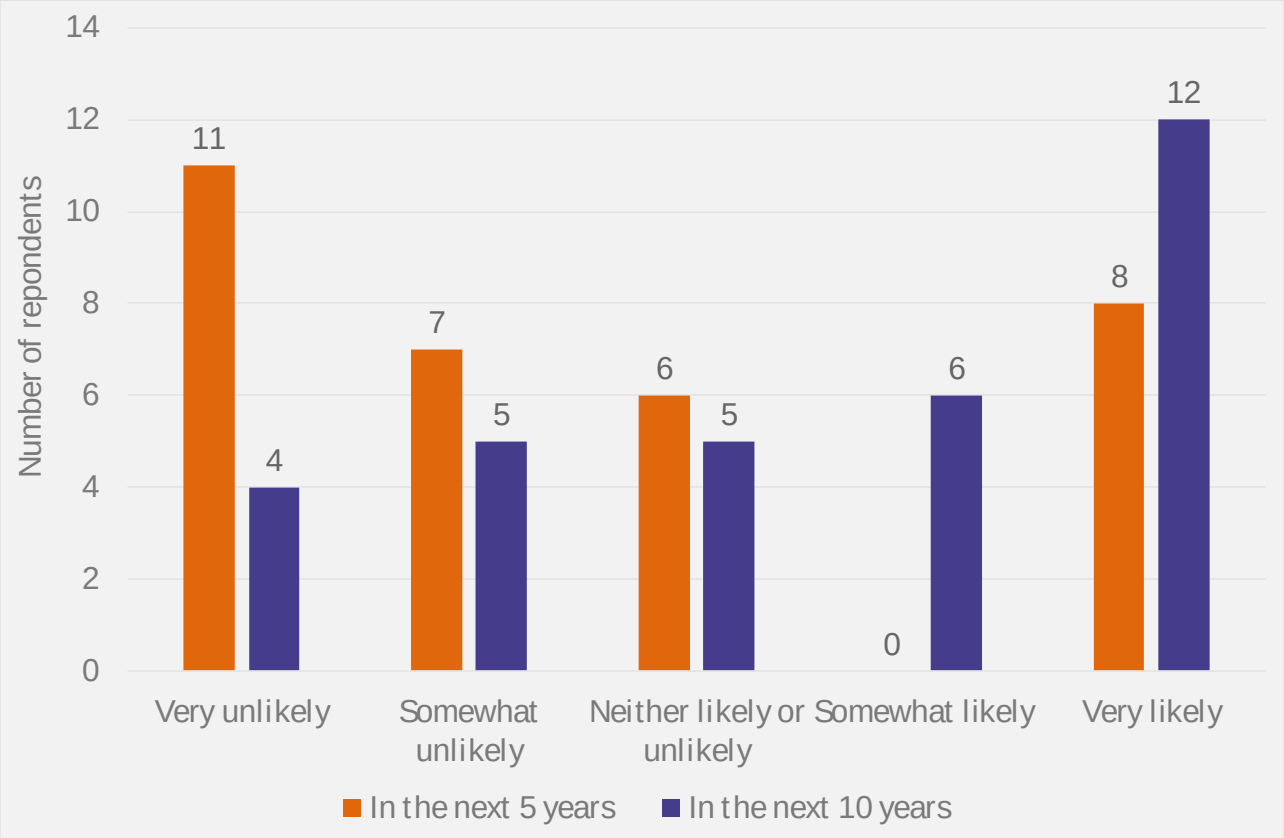
One of the stakeholders highlighted the trend of professional firms to rent desks by the hour. It is described in relation to the 'agile future' which will be characterised by flexible, and 'easy-term' leases.

Subsequently, we asked respondents about the services / support that they think companies could be provided to overcome any barriers to relocating. One manufacturing and retail company mentioned that they have relocated multiple times, and that the process has become 'a second nature' to them. Another company told us that although the managing directors did not have any direct experience with regard to relocation, the board of directors did, and they were able to draw on from their experiences. However,

the consensus was that additional information, such as guides on ‘how to’ and ‘what to’ do during the relocation process would be beneficial.

In terms of future plans, as is shown below, firms were more likely to indicate that they may relocate again in the next 10 years, rather than the next five years. This is consistent with firms moving every once in a while if both internal and external factors change, but not reacting immediately to changes.

Figure 21: Likelihood of future relocation



Reflection of results from interviews on economic theories of firm relocation

Here, we reflect on how the results of the interviews align with the theories of firm relocation presented in the conceptual framework. Overall, we have found behaviour that is consistent with each of the three main theories. In particular:

- In relation to the neo-classical theory, we found that firms did indeed relocate to maximise profit. We found that many 'economic' factors played a role in relocation decisions, such as proximity to customers, commercial property prices, and the availability of labour.
- However, the assumptions of full information and rational agents that the neo-classical theory is based on do not appear to hold in a large number of the firm relocations we discussed. Consistent with the behavioural theory, we found that factors such as the personal preferences of the business owner, and the familiarity of a places were key drivers in some cases. The decisions of smaller firms were more likely to align with the behavioural theory, and larger firms' decisions with the neo-classical theory.
- With regard to the institutional theory, the firms that we spoke to did not generally go through negotiations with other stakeholders during their decision-making process. There were, however, some instances of negotiations/consultations with staff and government.

Our interviews therefore support the relevance of all the main theories of firm relocation, along with the fact that they can all be jointly relevant for any one particular relocation.

6. Analysis of the IDBR

This chapter of our report sets out an analysis of the Inter-Departmental Business Register (IDBR). The purpose of this work is to provide up-to-date, quantitative information on the relocation behaviour of firms in the UK. We analyse what factors affect the probability of 'local units' (e.g. individual offices or factories) relocating from one geographic area to another. More specifically, our analysis focuses on local units that employ 50 or more employees, and that are within the manufacturing, professional services or technology sectors. This group forms our 'population of interest'.

In summary:

- Our analysis suggests that the **propensity of local units to relocate is relatively low** within our population of interest. Based on our approach to identifying relocations, we find that over the period 2007 to 2017, 0.47% of local units relocated between travel to work areas per year.[15] This finding is consistent with existing empirical evidence, as discussed in the previous chapter.

- **Relocations are more likely between areas that are geographically close together**. As the relocations between ever larger areas are looked at, the number of firms relocating between them reduces significantly. For example, over the period 2007 to 2017, we find that 3.66% of local units relocated between postcodes per year, whereas only 0.26% relocated between regions. Furthermore, we find that relocations between regions are far more likely between adjacent regions, and that the largest flows are between London and the South East, and the East of England. Specifically, around 40% of total regional relocations in the sample occurred between these three regions.

- Using a suite of 18 models, our econometric analysis explains only a small proportion of the variance in relocation decisions. This suggests that **there are other, unobserved, characteristics that are driving relocation decisions**. Based on our broader understanding, we suggest this may include factors such as: future 'physical' expansion or contraction plans (i.e. a significant change in staff numbers or space needed for production equipment); low profitability (in part driven by property costs); the expiry of an existing lease; and dissatisfaction with very local factors related to the current location (e.g. parking, traffic congestion, and the reputation of an area). These factors are hard to capture in the data, and therefore haven't been included within our analysis.

- However, **we do find a range of variables that are statistically significant, and consistent with our conceptual framework and previous studies**. Furthermore, these variables materially affect the predicted probability of relocation. In particular,

[15] Our approach to identifying relocations within the IDBR does not include expansions, and is partly dependent on firms recording in ONS surveys that a site has a new address, rather than 'closing' one site and 'opening' another.

based on our suite of models we find a statistically significant effect of factors such as industry, the age of a local unit, the number of staff it employs, and Gross Value Added (GVA) per head in the local authority district. Region also appears to be correlated with relocation choices, and is either being picked up in the models through regional dummies or region-specific variables, such as regional wage rates.

- There are **some variables that are included in our analysis that we would expect to affect relocations, but that are not statistically significant within our models**. For example, commercial property prices and factors related to transport. The effect of these drivers may be being masked by other variables that are both specified at the same geographic level and closely correlated.

- Indeed, the limitations of the econometric analysis should be kept in mind when interpreting the findings. Firstly, as noted above, there may be **missing variables** in our model i.e. factors that drive relocation choices but that aren't captured in our dataset. If these factors are correlated with the explanatory variables that we do have, our results may be biased. Secondly, there is likely to be a high degree of **collinearity** between our explanatory variables. For example, the regional wage level and the regional consumer price level are highly correlated with each other. This increases the level of uncertainty when assigning causality to variables.

The remaining sections of this chapter consist of:

- Objectives and scope of analysis.
- Data sources.
- Summary statistics.
- Econometric method.
- Econometric results.
- Conclusions from analysis of IDBR.

Objectives and scope of analysis

The overarching objective of our analysis of the IDBR is to provide up-to-date, quantitative evidence of firm relocation behaviour in the UK. We understand that the IDBR has not previously been used to assess firm relocation, and therefore our work adds to the current stock of knowledge.

Through discussions with the BEIS steering group, we developed a more specific scope and set of objectives for our analysis. In particular:

- Our work focuses on relocations of local units that employ 50 or more individuals and that are within manufacturing, professional services or technology sectors. The rationale for focusing on this population is that:
  - a local unit, as opposed to an enterprise (see below definitions), has a single geographic location at a point in time, and therefore location characteristics can more feasibly be included in econometric modelling;
  - the relocation behaviour of larger organisations is expected to have greater impact on local economies; and
  - the relocation behaviour of firms in the manufacturing, professional services and technology sectors are not constrained by consumer footfall (as retail organisations would be) or the location of raw materials (as mining company would be), but rather have more 'flexibility' in their choice of location. The drivers of relocation are therefore more uncertain and potentially varied – which means researching the behaviour of these firms is of greater interest to policy-makers.

Our main analysis considers relocations between travel to work areas.[16] This choice represents a trade-off between a larger distance that will have a greater impact on local economies and the volume of relocations that will allow for meaningful statistical analysis. Our extended analysis also considers relocations between local authority districts and regions. See

- Figure 24 for flow rates between different geographic areas.
- We model the probability of a local unit relocating based on a set of firm characteristics and location characteristics.

In short, the objective of our analysis is to answer the question: **what drives the choice to relocate, within our population of interest?** This may be relevant for policy making for a number of reasons. Firstly, understanding what factors affect a firm's choice to relocate away from a particular area could help with the development of policies to improve the attractiveness of areas to existing businesses. Secondly, by better understanding what types of local units are most likely to relocate, policy could either be developed to 'tip the balance' for these units, or be developed to address those that are currently less likely to relocate. Thirdly, the quantitative estimates of the absolute and incremental propensity to relocate can be used to conduct cost-benefit analyses of policies that could be expected to affect firm relocation behaviour.

[16] TTWAs are a geography created to approximate labour market areas. Generally, a TTWA consists of an area in which at least 75% of the resident workforce work in it, and at least 75% of the people who work it also live in it. There are 228 TTWAs in the UK (2011 definitions).

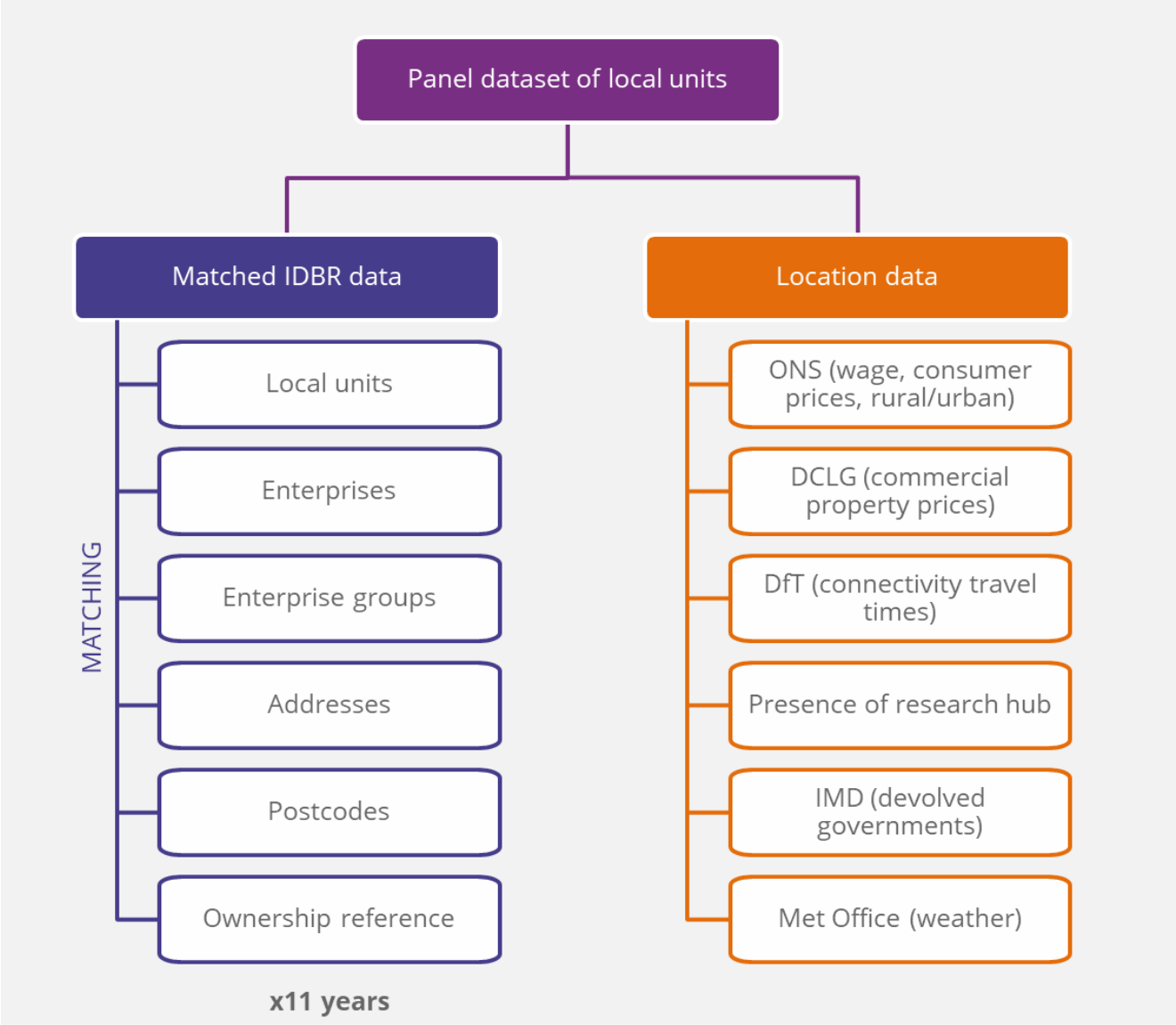
Data sources

Our dataset consists of:

- local unit characteristics from the IDBR; and
- location characteristics, from a range of sources, such as the Office for National Statistics (ONS), Department for Transport, and the Met Office.

As is illustrated in Figure 22 below, we have constructed our dataset by extensive matching processes, both to align data from within the IDBR and from the other sources.

Figure 22: Overview of dataset sources



In turn below, we discuss data from the IDBR and other sources, and then provide a list of the variables that we have used in our analysis.

IDBR data

The IDBR is a comprehensive list of UK businesses used by government for statistical purposes. It is used as the main sampling frame for surveys of businesses carried out by the ONS and other government departments. It covers 2.6 million 'enterprises' in all sectors of the UK economy, however doesn't include very small businesses (those without employees and with turnover below a tax threshold) and some non-profit making organisations. It's two main sources are the VAT system and the PAYE system, with additional data coming from Companies House, Dun and Bradstreet and ONS business surveys.

Within the database, information on firms is recorded at a number of different levels of aggregation. In particular:[17]

- A **local unit** is a single-site, such as an office, workshop, factory, warehouse, mine or depot.
- An **enterprise** is the smallest combination of legal units that has a "certain degree of autonomy in decision-making, especially for the allocation of its current resources". An enterprise can generally be considered a 'firm' or 'company'.
- An **enterprise group** is an association of enterprises bound together by legal and/or financial links e.g. a conglomerate.

The above definitions are important for interpreting our analysis, which considers the relocation of local units, but also includes enterprise and enterprise group level characteristics.

To conduct our analysis, BEIS provided us with 11 annual snapshots of the IDBR, taken in March of each year from 2007 to 2017.[18]

Whilst the IDBR is a rich dataset, it does have limitations. Data is pulled from a number of sources, and data points such as turnover and employment are not necessarily updated on an annual basis. We understand that the accuracy of the dataset is generally better for larger firms, and given our focus on local units with 50+ employees, we believe this is less of an issue for us. We note that some misalignment between the years for which data is presented and actual values is inevitable.

In addition to the raw IDBR data, BEIS also provided us with tables consisting of 'canonical' enterprises. The enterprises within these tables are designed to ensure statistics produced from them match similar statistics produced by the ONS.[19] The starting

[17] The precise wording of the definitions used for the IDBR can be found in Appendix B.

[18] This equates to about 35GB of data, and is split across over 120 separate tables. For example, data for local units, enterprises and enterprise units is held in separate tables, along with address and postcode data in further additional tables. Manipulating the dataset is therefore been a significant job in itself.

[19] Given the complexity and multiple sources of the IDBR, the ONS undertakes extensive work to ensure that data from within the IDBR is accurately matched to the correct entities, and that the statistics it produces are reflective of the population.

point of our analysis has been the canonical enterprises, and, as shown in Appendix B, we have also checked that these match statistics published by the ONS.

From the list of canonical enterprises and their 3.1 million local units, we have identified those that match our size and industry definitions.[20] The effect of these selection criteria is illustrated in Table 7 below for local unit observations in 2017.

Table 7: Number of local units in 2017 that meet our selection criteria

	Number of local units
Belonging to canonical enterprises	3,122,767
…with 50+ employees	92,474
…and within industries of interest	28,541

In order to identify relocations (as detailed further below), we need to observe the same local unit in two separate years. As such, we have matched observations of local units between consecutive time periods based on the unique identifier for local units. In addition, we have also identified those local units that are present in our sample across all 11 years.

Notably, there are a number of reasons why a local unit that is present in one year may not be present in another. In particular, local units can:

- be 'born' or 'die';
- change their canonical status;
- change their unique identifier, including because of a change in the company structure and therefore its reporting and recording; or
- cross the 50 employees threshold.

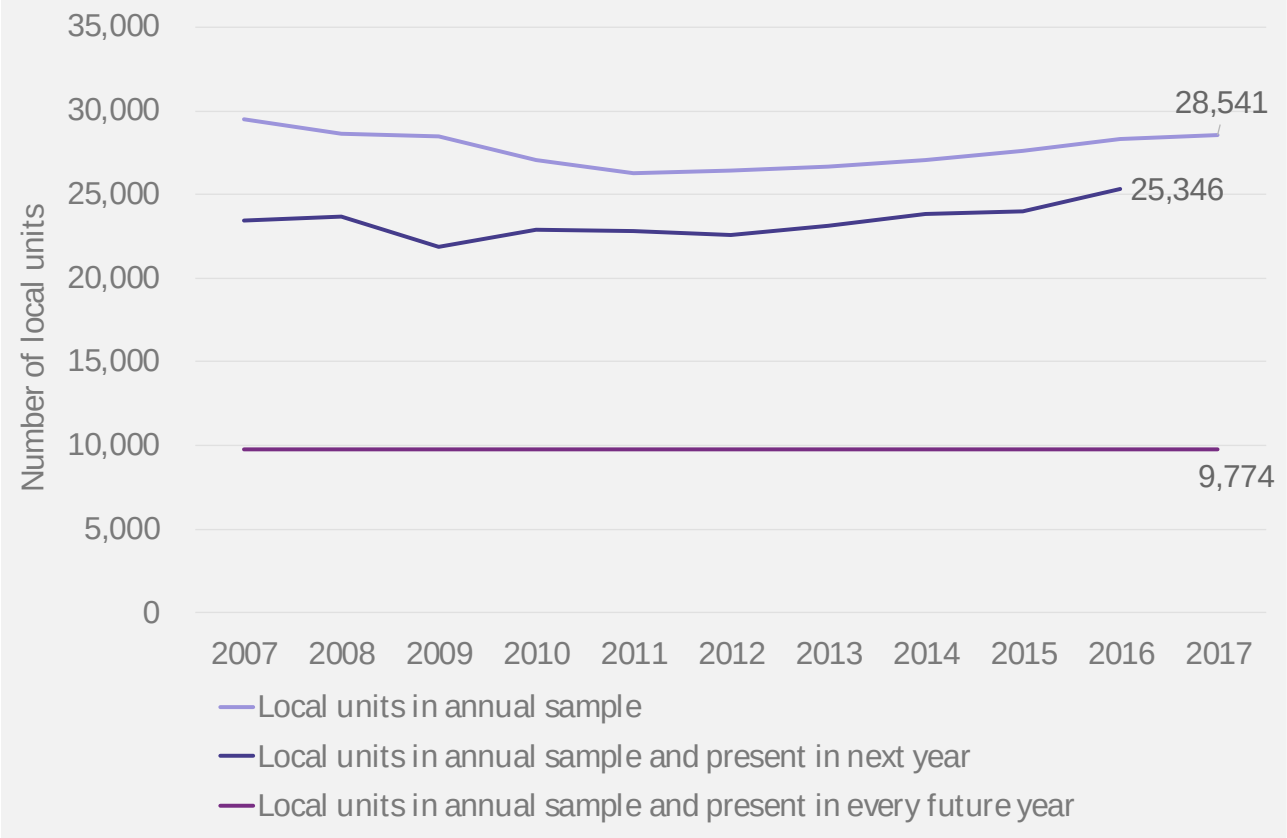
Figure 23 below shows the number of local units:

- that meet our selection criteria in each year of our sample (top line) i.e. 28,541 units meet our sample criteria in 2017;
- that are present and identifiable in the given year and the next year (middle line) i.e. 25,346 units meet our sample criteria in both 2016 and 2017; and

[20] We used the following high level SIC code categories to identify local units within manufacturing, professional services and technology sectors: manufacturing (section C); information and communication (section J); financial and insurance activities (section K); professional, scientific and technical activities (section M); and administrative and support service activities (section N).

– that are present and identifiable in all years of our sample (bottom line) i.e. 9,774 units are present and identifiable in all years.

Figure 23: Number of matched local units



The largest sample that we use within our econometric analysis is 233,561 observations of local units that are present in two consecutive years i.e. roughly 23,000 from each year pair of consecutive years[21].

Within this sample of local units, we subsequently identify relocations based on a change in address. That is, cases in which:

– for a given local unit identified across two consecutive years by its unique identifier;

– its address changes between the two years.

Furthermore, we identify relocations for which addresses change at different geographic levels. In particular, relocations between: postcodes; Lower Super Output Areas (LSOAs); local authority districts; TTWAs; and regions (the nine regions of England, plus Wales, Scotland and Northern Ireland).

[21] The local units that are matched between each two consecutive years as follows: 2016 and 2017, 2015 and 2016, 2014 and 2015, 2013 and 2014, 2012 and 2013, 2011 and 2012, 2010 and 2011, 2009 and 2010, 2008 and 2009, 2007 and 2008.

The type of relocations that will be captured by our approach will vary depending on whether the enterprise has one or more sites.

- For single-site firms, we understand that our approach is a strong identifier of firm relocations. Given that a single-site firms only have one location by definition, a change in their address most likely represents a relocation.

- For multi-site firms, we understand that our approach will capture cases where a business has essentially reported that a local unit has been moved from one site to another. A business can either report an existing site as 'closed', and report the details of a new site, or change the address of the site that is moving. Through correspondence with the ONS, we understand that the latter approach is easier in term of completing the surveys, and therefore that it can be expected to be the approach taken by most businesses.

Therefore, in reference to the definition of firm relocation set out in chapter 3, our approach to identifying relocations will not capture expansions (i.e. 'births' of new local units) or instances in which a business has reported that one local unit has closed down and another opened (despite in practice there being some relocation of assets). It should be kept in mind that references to 'relocation' within this section of our report relate only to relocations that can be identified through our approach.

Further to using the IDBR to identify local units and whether they have relocated, we use it to define a range of variables in relation to the characteristics of the local units. The full set of variables that we use in our econometric analysis is set out later.

Location characteristics data

We have collected and matched into our dataset a variety of variables that reflect both the 'market' and 'non-market' characteristics of where local units are located in the first year of each comparative period. This allows us to test whether characteristics that are specific to locations (such as wage rates, transport, and climate) affect firms' decisions to relocate.

We have drawn this data from a variety of sources, and the time periods and locations that the data relate to vary between factors. The main implications are that:

- In matching location data to IDBR data, for time periods for which we do not have a specific location variable, the latest available data is assigned. For example, in the case of relative regional consumer price level, for our dataset, the variable is only available for 2010, and we assign the regional figures of that year to the rest of the years included in our analysis (i.e. 2007-2009 and 2011-2017). Additionally, the connectivity variables which include travel time to closest railway station; airport; and road junction are available for 2013, and we assign the figures identified at the LSOA level to the rest of the years included in the analysis.

- The geographic area for which a variable is specified varies, both 'by design' and by limitations of the data. For example, rural/urban classification is available at the output area, whereas other variables such as rainfall data are available at a higher regional

granularity. Variables such as wages and property prices are not available at the travel to work area level, and we use the regional values of these variables to reflect wider regional characteristics.

- Some variables are only available for certain countries in the UK. For example, connectivity travel time variables are only available for England, and commercial property prices are only available for England and Wales.

- Some variables of the econometric analysis have been calculated. For example, in the case of the Index of Multiple Deprivation (IMD), it is calculated separately for each of the four countries of the UK, and to have a consistent measure across the four countries, we calculated an adjusted IMD that allows for a direct comparison across the four countries. The variable showing the presence of a research hub is also calculated based on the presence of a Russell Group university in a local authority district.

Variables included within our analysis

The variables that have been included in the analysis are listed below, and the full description and source of the variables is in Annex B.

Table 8: Summary of variables included within analysis

Firm characteristics	Market location factors	Non market location factors
• Industry. • Employment. • Turnover. • Age. • Type (single or multi-site enterprise). • Number of local units belonging to the enterprise within our sample. • Ownership. • Change of local unit size. • Previous relocation.	• Presence of research hub. • GVA per head. • Wage level. • Price level. • Commercial and industrial property prices. • Travel time to closest railway station. • Travel time to closest airport. • Travel time to closest 'major' road junction. • Rural / urban.	• Index of Multiple Deprivation. • Rainfall.

Firm characteristics	Market location factors	Non market location factors
	• Regional dummies.	

Summary statistics

Each of the following sub-sections presents:

- the number of relocations identified;
- comparisons of relocating local units with all local units;
- flows between regions.

Number of relocations identified

Based on our approach discussed previously, the rate of relocations per year is relatively small, but consistent over our time period.

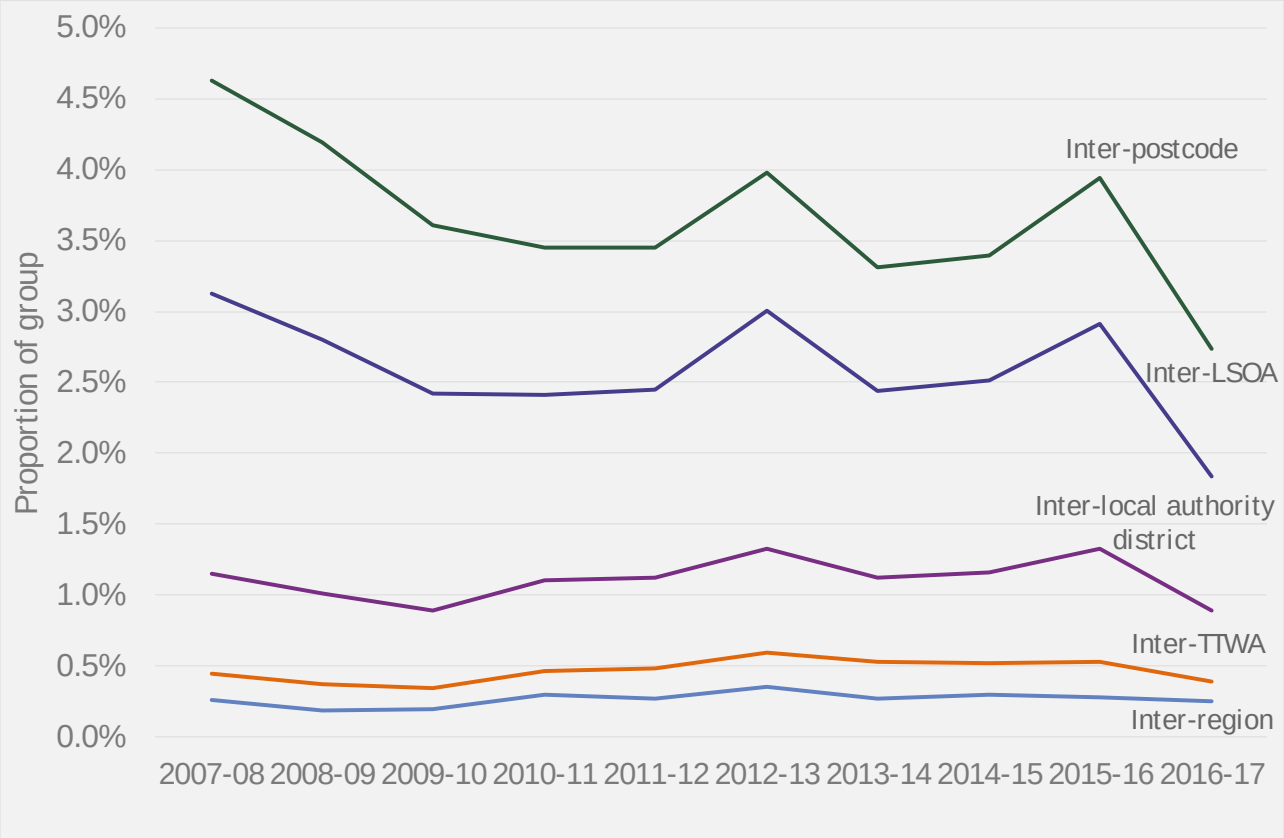
Table 9 below gives the total number of relocations that we have identified over different geographic distances. These figures relate to the whole time period 2007-2017. For example, we have identified 1,087 inter-TTWA relocations, which is equivalent to 0.47% of local units relocating in each year of our sample period.

Table 9: Number of identified relocations

Relocation distance	Number of relocations identified 2007 2017	Equivalent % of local units that relocate each year
Inter-postcode	8,554	3.66%
Inter-LSOA	6,549	2.80%
Inter-local authority district	2,589	1.11%
Inter-TTWA	1,087	0.47%
Inter-region	617	0.26%

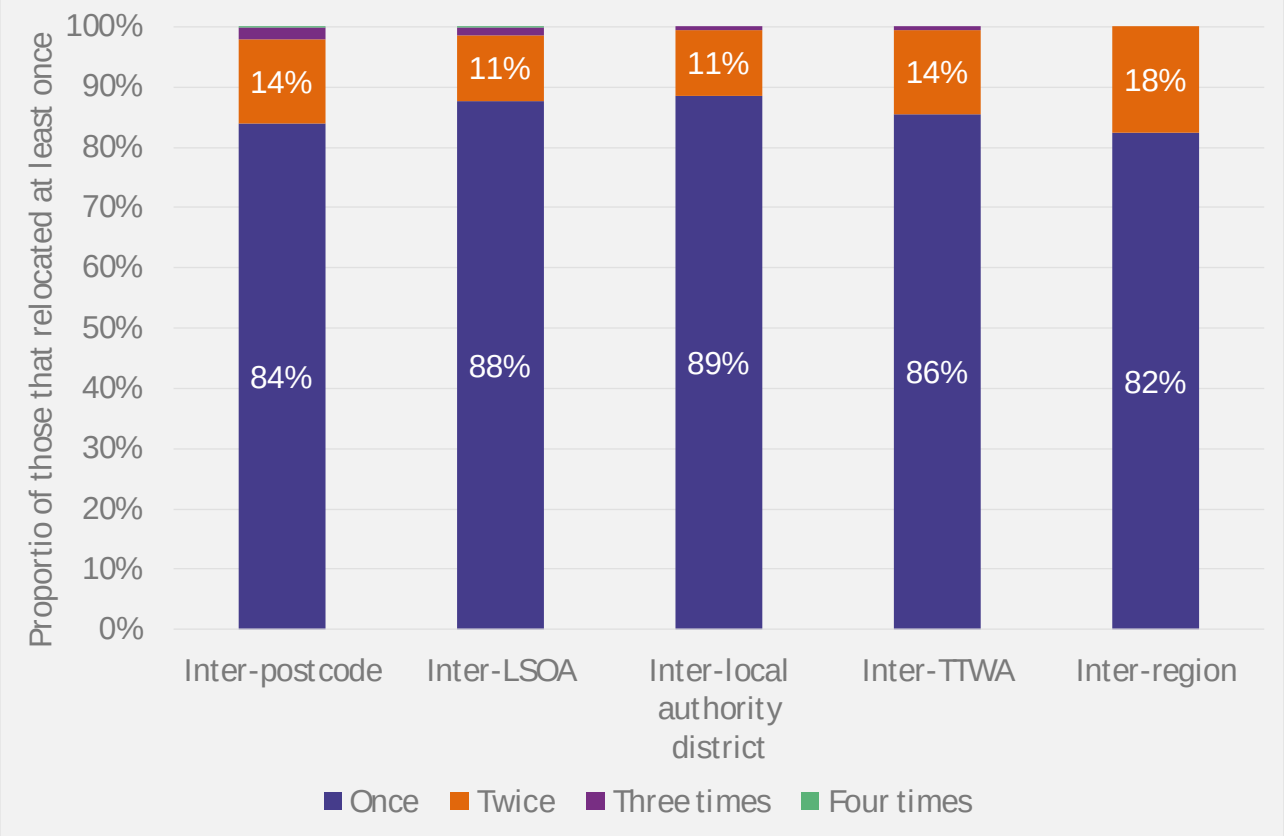
Figure 24 below shows that the proportion of local units relocating over different distances has remained of a similar order of magnitude over time, and that there is no discernible long-term trend. We are not aware of any methodological reason for the 'peaks' or 'drop' in the last time period. As can be seen the figure, the proportion of local units that have relocated based on a change in TTWA is relatively stable around 0.47% over the sample years.

Figure 24: Proportion of local units relocating over time



Furthermore, of the 9,774 local units that are present throughout our time series, Figure 25 below shows the proportion that relocated more than once during the period across different geographic distances. Within our econometric analysis we test whether having relocated before increases the probability of relocating again.

Figure 25: Proportion of local units that have relocated more than once



Comparison of relocating local units with all local units

To provide an initial sense of what the drivers of relocation could be, we compare the characteristics of local units that have relocated with the population of all local units. In this section we present comparisons for only 2016-17, but the patterns observed generally hold true across the sample period. Our analysis here is also constrained to inter-TTWA relocations.

As can be seen from the following figures, in 2016-17:

- Inter-TTWA relocations are slightly more prevalent among local units with fewer employees (Figure 26)
- Relocations are more prevalent among local units engaged in administrative and support service activities, and less prevalent among local units in the manufacturing and financial services sectors (Figure 27).
- Relocations are more prevalent among younger local units (Figure 28).
- Inter-TTWA relocations are more prevalent among single-site local units, and less prevalent among local units that are part of a multi-site enterprise (Figure 29).

Figure 26: Number of employees of local units in our 2016-17 sample compared to those that relocated in 2016-17

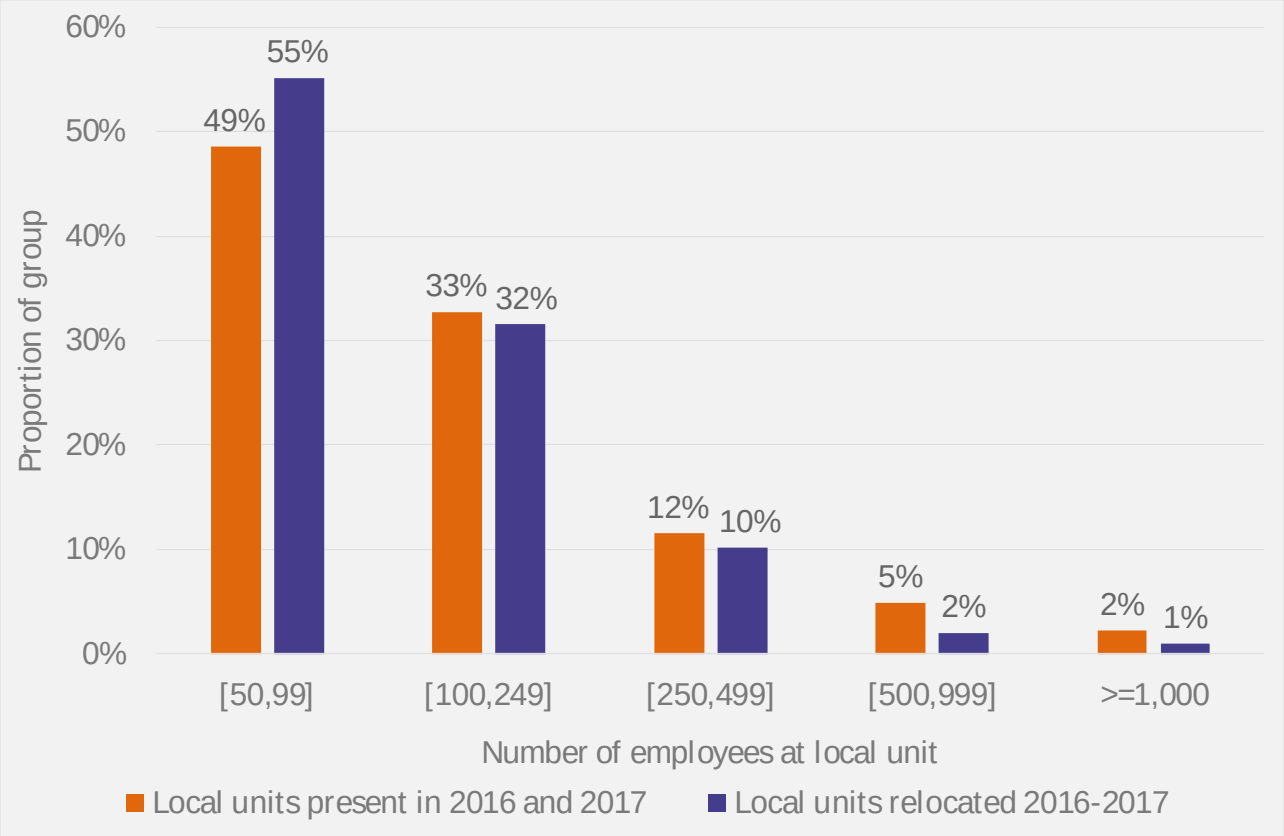


Figure 27: Industry of local units in our 2016-17 sample compared to those that relocated in 2016-17

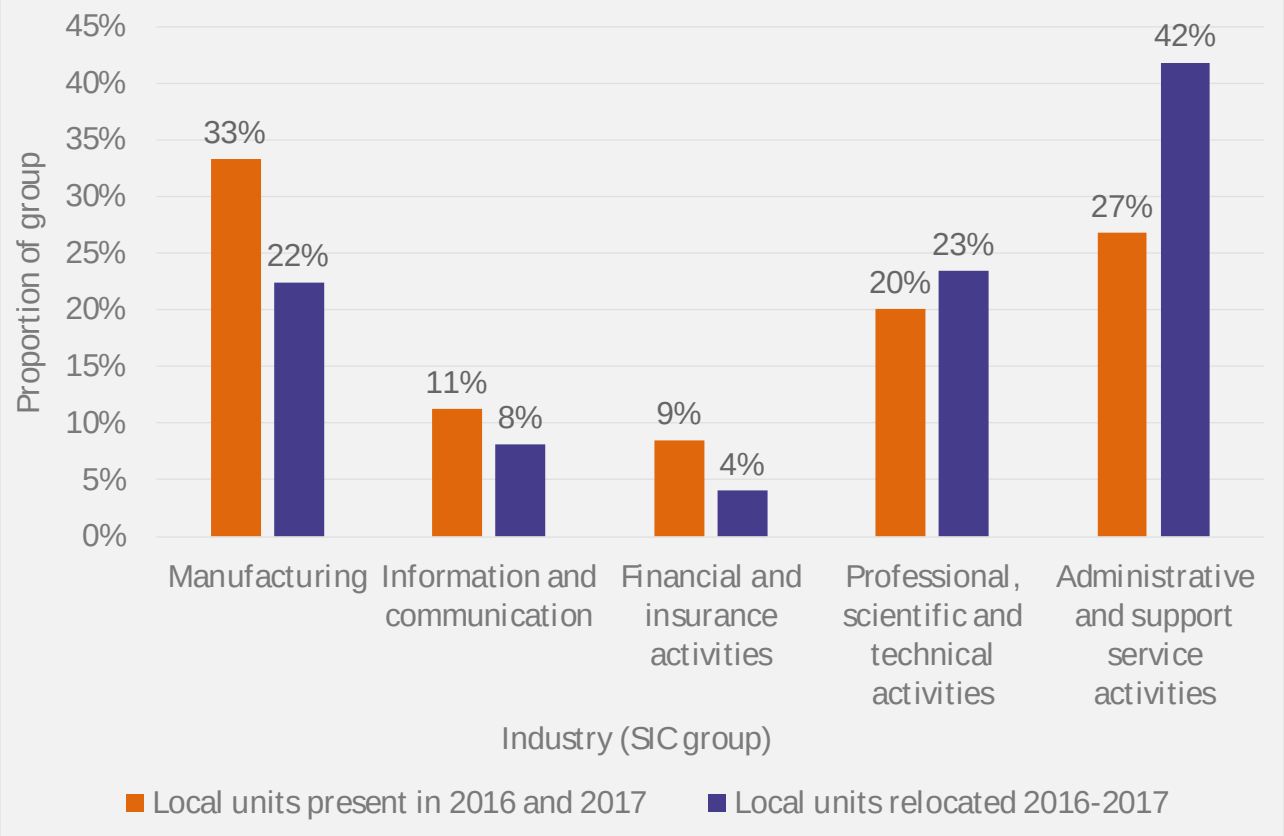


Figure 28: Birthdate of local units in our 2016-17 sample compared to those that relocated in 2016-17

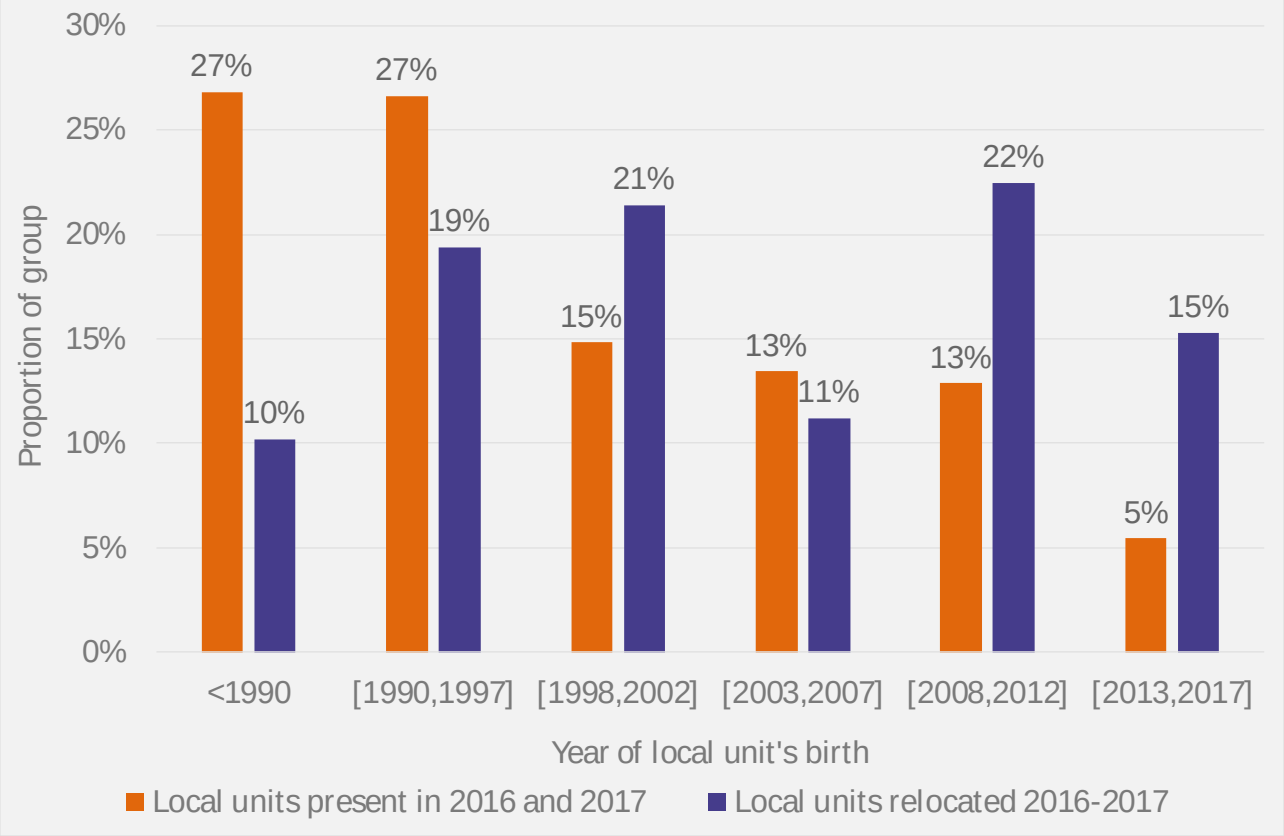
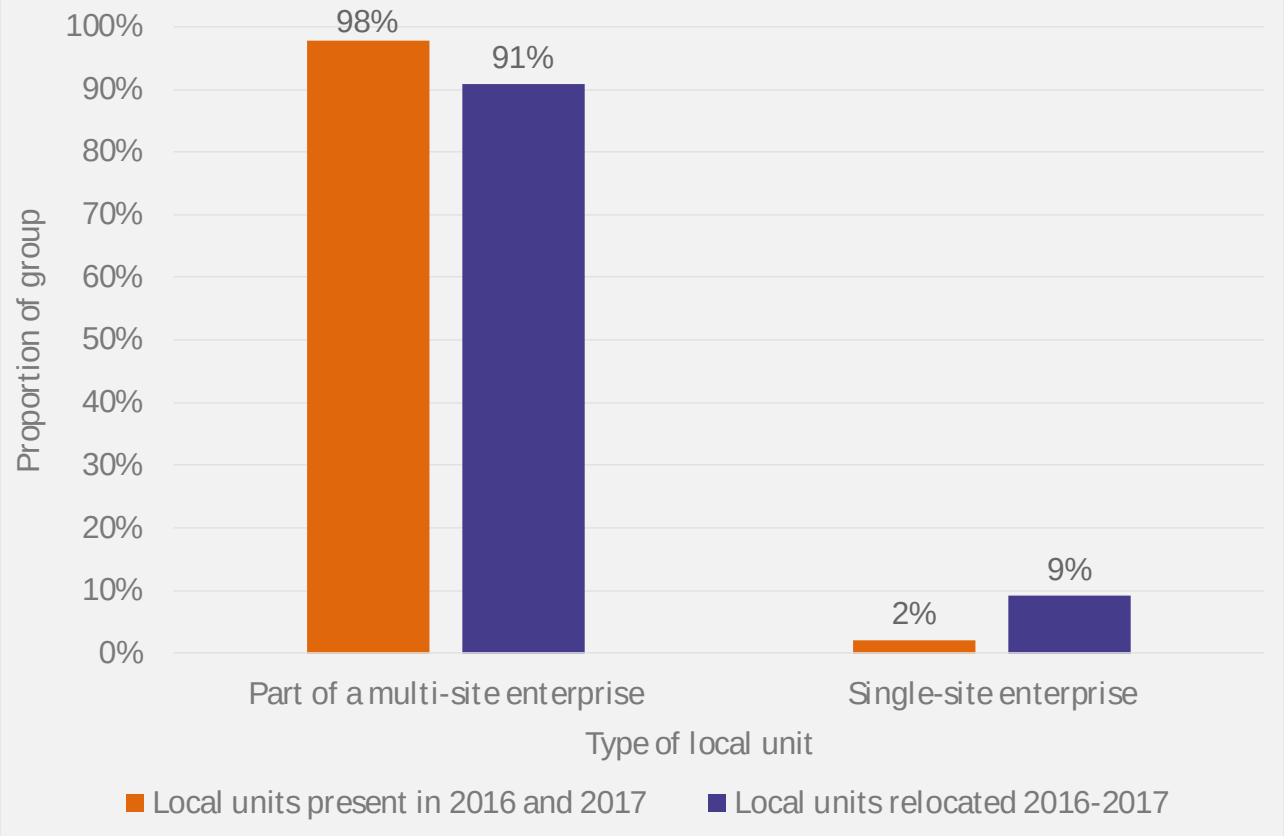


Figure 29: Type of local units in our 2016-17 sample compared to those that relocated in 2016-17



Flows between regions

Relocations are more prevalent between areas that are geographically close to each other. That is, a local unit is more likely to move to a new destination close to its old destination. For example, the greatest flow of local units out of the West Midlands is to the East Midlands. Furthermore, relocation activity is more prevalent into and out of London e.g. from London to the South East, and from the South East to London. These trends are illustrated in Figure 30 below based on the 617 inter-region relocations identified over our whole sample time period.

We have additionally looked at the movements of local units that are present in all years of our sample, and identified those that have relocated more than once based on inter-region movements. There were 19 such local units, and out of these, 18 local units moved back and forth between the same two regions e.g. moving from the West Midlands to the East Midlands, and then back again. These relocations took place between both neighbouring regions and those further afield.

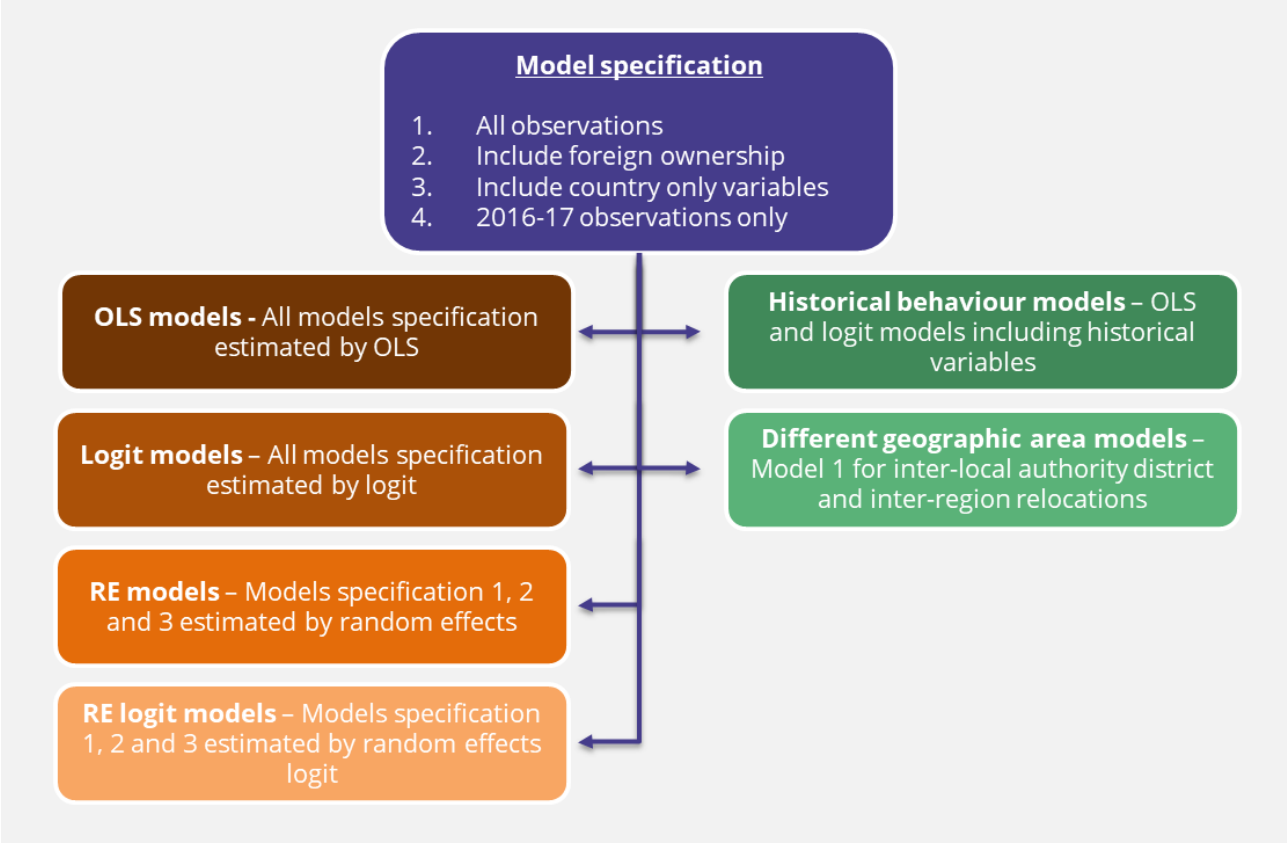
Figure 30: Relocation flows between regions 2007-2017 (number of local units relocating from origin to destination region)

		Destination												
		North East	North West	Yorkshire and The Humber	East Midlands	West Midlands	East Anglia	East of England	London	South East	South West	Wales	Scotland	Northern Ireland
Origin	North East	-	3	5	0	0	0	0	3	1	1	1	1	0
	North West	5	-	7	5	6	1	2	8	2	3	5	2	1
	Yorkshire and The Humber	5	2	-	11	5	1	2	6	3	0	1	3	0
	East Midlands	2	7	4	-	15	2	3	6	2	4	0	0	0
	West Midlands	1	8	1	12	-	1	3	8	6	2	1	2	0
	East Anglia	0	0	1	3	0	-	6	3	3	2	0	0	0
	East of England	1	3	4	4	1	6	-	30	11	3	0	0	0
	London	3	13	3	4	7	5	45	-	79	6	1	1	0
	South East	1	7	2	3	6	4	14	71	-	7	2	0	1
	South West	1	4	2	0	6	0	2	3	12	-	3	0	0
	Wales	2	2	0	0	2	0	1	3	5	1	-	0	0
	Scotland	0	1	0	1	0	1	0	3	2	1	0	-	0
	Northern Ireland	0	1	0	0	0	0	0	0	1	0	0	0	-

Econometric method

Our econometric approach consists of using a suite of models to test the range of different variables, along with addressing different statistical modelling issues. As illustrated below, we have four model specifications estimated by four different estimation techniques, along with a variety of extended models.

Figure 31: Illustration of model suite



More specifically, the four model specifications are:

1. **All observations**. This includes all observations of local units that we have identified across all pairs of consecutive years (233,561 observations). This means that this model also includes all 1,087 observations of relocations that we have identified. This specification includes all variables that are defined for all observations.
2. **Include foreign ownership**. This specification includes a variable denoting whether a local unit is owned by an immediate foreign owner. As this is only known for a subset of 161,250 observations, this model has a lower sample size than model 1. We are not aware of there being a specific reason as to why immediate foreign ownership is not defined in the IDBR for all units, and therefore assume that no bias is created by restricting our sample in this way. However, model 1 somewhat protects against this risk.
3. **Include country only variables**. Similar to above, this specification includes additional variables that are not defined for all variables. In particular, it includes

variables that are only defined for either England, or England and Wales. Namely: connectivity travel time and commercial and industrial property prices. This specification has a sample size of 139,663.

4. **2016-17 observations only**. This specification is model 1 limited to only the 25,346 observations from 2016-17. It checks that there are no significant differences in drivers between the whole sample and the last year of our sample period.

In total 14 models were estimated using the different estimation techniques and control variables, we call these our 'suite of models'. The estimation techniques (OLS, Logit, Random Effects, and Logit Random Effects) each have their strength and weaknesses, and estimating the whole suite of models allow us to understand the robustness of our results and ensure we do not attach undue weight to one particular model over another. Further details on the econometric models is give in Appendix B.

In addition to the suite of models 14, we explore two further models to test for historical variables and alternative geographic definitions for relocation, as follows.

- **Historical behaviour models**. These models are based on the sample of 9,774 local units that are observed in every period of our sample. This allows us to include variables that can only be defined if local units are observable over the entire time period. Specifically, whether a local unit has significantly expanded or contracted, or relocated on a previous occasion in the last 10 years. The dependent variable in these models specify whether the local unit relocated in 2016-17. We use both OLS and logit to estimate the models.

- **Different geographic area models**. Whereas the above models consider inter-TTWA relocations, these models estimate the probability of a local unit relocating between local authority districts and regions. They are effectively model 1 with different dependent variables.

Therefore, in total, we have 18 models.

Econometric results

In the sections below we first set out the results of the analysis of the suite of models, and then the extended analysis.

Analysis of 'suite of models'

In Table 10 below, we present the summary results of the sign and statistical significance of the variables included in our suite of models. Consistent with our conceptual framework, variables are colour-coded to reflect firm characteristics, non-market location factors, and market location factors. For each variable, the table specifies the number of models in which the coefficient is statistically significant and positive, statistically significant

and negative, and insignificant, out of the total number of models that include the variable. We highlight the column for which the greatest number of models relates.

Table 10: Sign and significance (at 10%) of variables across suite of models

Variable	Positive	Negative	Insignificant
Manufacturing (local unit)	0/14	12/14	2/14
Information and communication (local unit)	0/14	8/14	6/14
Financial and insurance activities (local unit)	0/14	8/14	6/14
Professional, scientific and technical activities (local unit)	0/14	3/14	11/14
Number of employees (local unit)	0/14	10/14	4/14
Turnover (enterprise)	5/14	0/14	9/14
Birth year (local unit)	14/14	0/14	0/14
Single-site enterprise (enterprise)	14/14	0/14	0/14
Number of local units belonging to the enterprise within our sample (enterprise)	0/14	4/14	10/14
Immediate foreign owner (enterprise group)	0/8	0/8	8/8
Wage level (region)	7/14	0/14	7/14
Consumer price level (region)	0/14	5/14	9/14
GVA per head (local authority district)	0/4	12/14	2/14
Rural (output area)	0/14	1/14	13/14
Russell Group university in same area (local authority district)	0/14	9/14	5/14

Variable	Positive	Negative	Insignificant
IMD (local authority district)	0/14	12/14	2/14
Rainfall (region)	0/14	6/14	8/14
Post crisis	10/12	0/12	2/12
Time trend	9/12	9/12	3/12
North East	0/6	2/6	4/6
North West	0/6	4/6	2/6
Yorkshire and the Humber	(omitted)	(omitted)	(omitted)
East Midlands	0/6	2/6	4/6
West Midlands	0/5	1/5	4/5
East	0/6	2/6	4/6
South East	0/6	1/6	5/6
South West	0/6	4/6	2/6
Wales	0/5	2/5	3/5
Scotland	0/5	3/5	2/5
Northern Ireland	0/4	1/4	3/4
Commercial property prices (region)	0/4	0/4	4/4
Travel time to closest railway station (LSOA)	1/4	0/4	3/4
Travel time to closest airport (LSOA)	0/4	3/4	1/4
Travel time to closest ‘major’ road junction (LSOA)	1/4	0/4	3/4

We note that the suite of models identifies a range of statistically significant drivers of the probability of relocation. This suggests that the choice to relocate is not 'random', and the factors that we have identified in the conceptual framework and through the literature review do have an effect on behaviour within our sample.

To interpret the signs, significances and magnitudes of the individual coefficients, we consider all our suite models jointly.

Firstly, it can be seen that there is a high degree of consistency in terms of the sign and significance of variables. This provides confidence in the robustness of the results from any particular model.

We make the following observations about the individual explanatory variables.

- **Industry**. Consistent with economic theory and findings from the literature, local units in the manufacturing industry are less likely to relocate in comparison with local units that are in the professional, scientific, and administrative services industries.

- **Size**. In line with findings from the literature, local units with large number of employees are less likely to relocate than local units with smaller number of employees. Turnover is generally insignificant in our models, which is defined at the enterprise level and accordingly could be less reflective of the unique characteristics of the local unit.

- **Age**. Consistent with economic theories and findings from econometric studies, younger local units have a higher propensity to relocate.

- **Single-site**. Local units owned by single-site enterprises are more likely to relocate in comparison with local units that belong to multi-site enterprises. One hypothesis to explain this is that making changes to the locations of multi-site enterprises is more complex (due to interrelations between sites) and therefore is less likely to happen. Another hypothesis is that it could be a result of our identification approach not picking up some relocations of local units belonging to multi-site enterprises, if they are reported as the closure of one site and the opening of another (see discussion of our approach to identifying relocations above). That is, we may be underrepresenting the prevalence of relocations among local units owned by multi-site enterprises. It should be kept in mind that the probability of a local unit relocating and the probability of an enterprise relocating can be very different. It only takes one local unit to move for a multi-site enterprise to be considered as having relocated, and therefore it can be that the probability of local units belonging to multi-site enterprises relocating be lower than that for local units of single-site enterprises, but the probability of multi-site enterprises relocating be higher than that for single-site enterprises.

- **Regional 'economic' factors**. Commercial and industrial property prices, and consumer price level are statistically insignificant in our models. This could be partly due to the fact that relocations occur between regions that are geographically close to each other, where the variance in these variables is small. Regional price levels appear to be positive and statistically significant in half of our models and statistically

insignificant in the other half, this could be a factor of the regional dummies picking up some of the effect of wages.

- **Local authority district IMD score and GVA per head**. These coefficients are both negative, suggesting that businesses in areas with higher productivity are less likely to relocate; whereas businesses in areas with higher levels of deprivation have a lower propensity for relocation. The former could suggest that businesses in productive areas have already found a 'good' location, and therefore are less likely to leave, and that businesses in more deprived areas are more dependent on serving their local markets.

- **Presence of research hub.** The coefficient is negative indicating that firms are less likely to relocate if there is a Russell Group university in the same local authority district as they are. This is consistent with access to research and access to graduate labour both being important to firms.

- **Time trend and post crisis dummy**. The sign of the time trend and the post crisis dummy act in opposing directions i.e. somewhat cancelling each other out. The overall sign and significance of the time trend is therefore ambiguous.

- **Connectivity travel time variables**. The travel time to closest railway station and closest road junction are in general insignificant in our models, while the coefficient on travel time to closest airport is negative. The negative coefficient on airport could reflect the fact that firms that are close to airports are there specifically because of the airport, and are somewhat tied to it – and as such are less able to relocate away from it.

- **Foreign ownership**. The variable is statistically insignificant in our models, which suggests that once other factors are controlled for, whether a unit is foreign owned or not does not affect its propensity to relocate.

- **Regional dummies**. The regional dummies in our econometric models are specified relative to London, and show some negative and statistically significant effects. This indicates that there could be other variables that we do not control for that are contributing to regional differences, and the higher prevalence of relocations out of London.

Regression outputs for these models are given in Appendix B.

Additionally, we calculate the impact on the probability of relocation resulting from a change in the independent variables as of the results of the logit random effects models. Specifically, we take the average of the change in predicted probability across model specifications 1 to 3 estimated by logit random effects. More specifically, we calculate:

  - for continuous variables, the average absolute change in predicted probability resulting from a two standard deviation change away from the mean (i.e. the difference between the probability at the mean plus one standard deviation and

the probability at the mean minus one standard deviation) in the explanatory variable;[22] and

– for dummy variables, the absolute change in predicted probability resulting from it being 'off' or 'on'.

This gives a measure of the magnitude of the effect of each factor. From this, a sense of the relative importance between factors can be taken, along with the effect of the factors relative to the average propensity to relocate (which is 0.47% within the largest sample). Notably, the predicted probabilities are relatively low in an absolute sense. This means that although the models identify some drivers of firm relocation, there must be other unobserved characteristics that explain a large proportion of the choice to relocate (such as planned expansion).

We present magnitudes separately for firm and location characteristics. In relation to firm characteristics, as shown below, we note that:

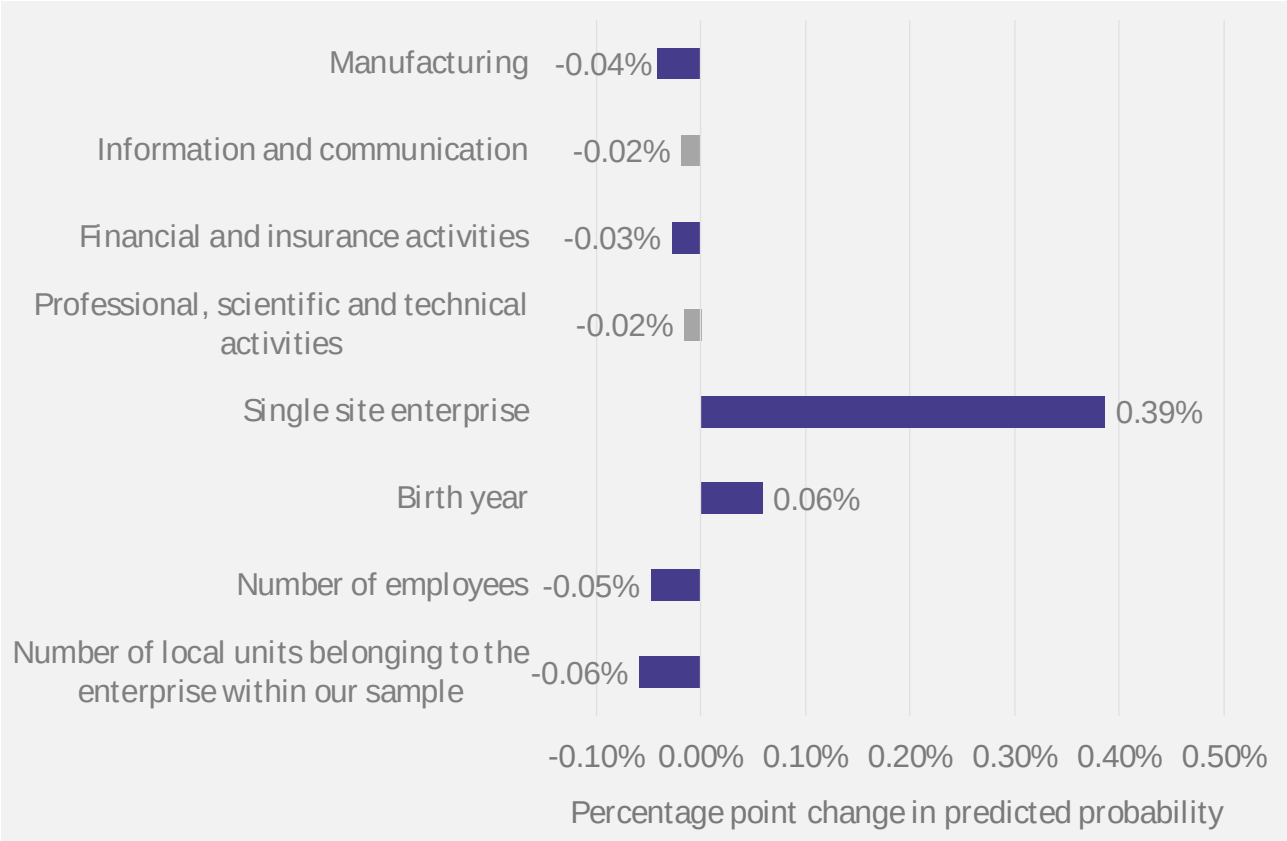
- Whether the local unit is part of a single- or multi-site enterprise has the largest effect on the predicted probability. One explanation for this could be that single-site relocations are more prevalent within our dataset due to our approach to identifying relocations. That is, some movements of local units may be reported as the closing down of one site and the opening up of another, and therefore multi-site relocations could be 'under-represented' in our sample (see the above section detailing our approach to identifying relocations for more details). It should also be kept in mind that this result does not necessarily suggest that single-site enterprises are more likely to relocate than multi-site enterprises (i.e. it would only take one local unit for a multi-site enterprise to have relocated).

- For the majority of local units, age is a larger driver of relocation behaviour than the number of employees.

- With regard to location characteristics, the presence of a research hub and GVA per head appear to have a larger impact on the probability of relocation in comparison with other location variables. Wage level and travel time to closest railway station also appear to have a large impact on the probability of relocation in comparison with other variables, however, across our suite of models, these variables tend to be insignificant.

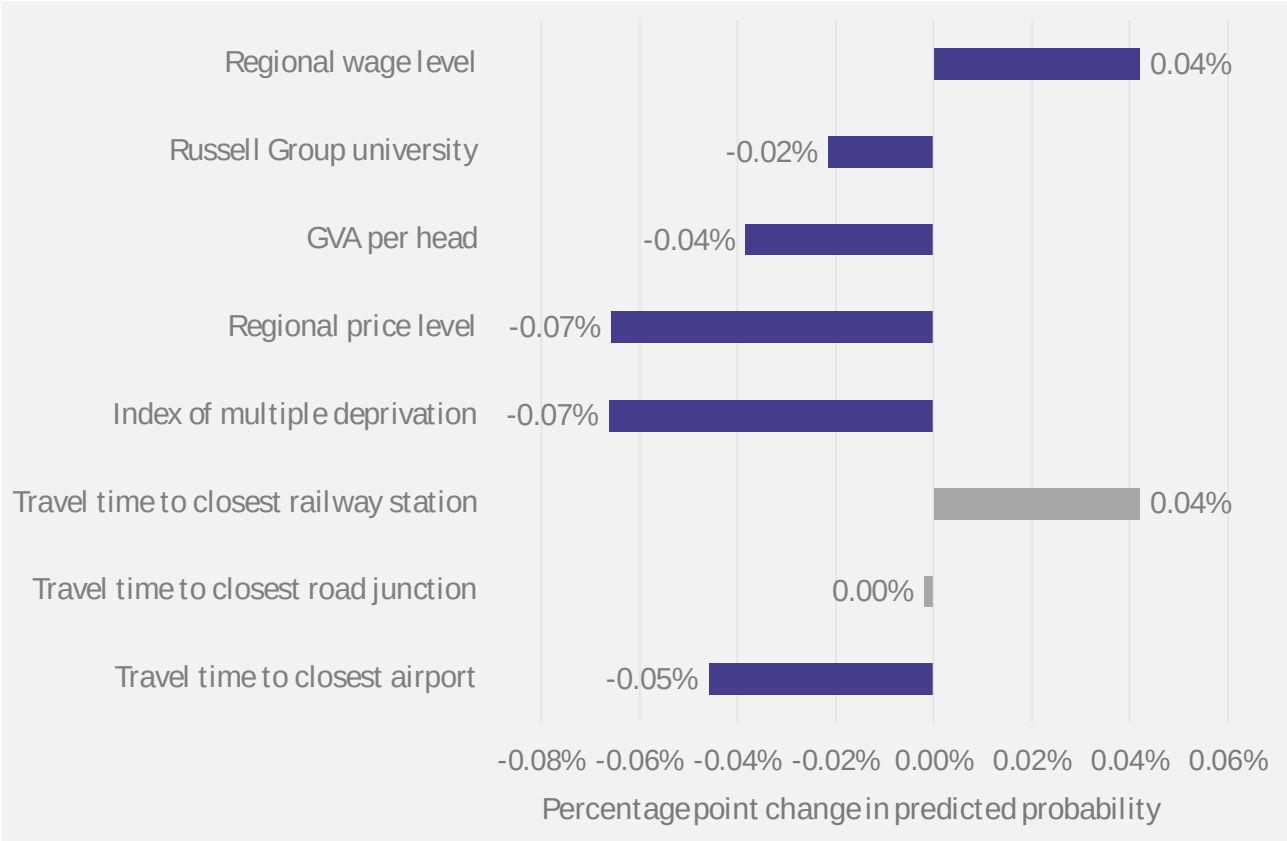
[22] Both the sign and magnitude of coefficients are relatively consistent between models, and therefore such averages are a reasonable summary of the models in general.

Figure 32: Average magnitudes of effects of firm characteristics in logit random effects models, based on two standard deviation change or dummy 'off'/'on'



Note: variables that are not statistically significant as of the logit random effect models appear in grey, variables that are statistically significant appear in dark blue.

Figure 33: Average magnitudes of effects of location characteristics in logit random effects models, based on two standard deviation change or dummy 'off'/'on'



Note: variables that are not statistically significant as of the logit random effect models appear in grey, variables that are statistically significant appear in dark blue.

We also calculate the change in the probability of relocation resulting from changes in regional dummies from the OLS models, in given in Appendix B.

Extended analysis

Figure 34 on page 120 illustrates the sign and significance of all 18 models in our analysis. We make the following observations.

- There is a relatively high degree of correlation between the suite of models and the alternative estimation techniques.
- Where regional dummies are included, they often appear to add explanatory power. Where they are not included regional wage often has a significant coefficient. This suggests that there are regional factors – or at least drivers correlated with region – that are affecting relocation choices.
- Furthermore, the logit and random effects models find that some area-specific variables are significant, over and above those identified by the OLS models. These include regional wages, the regional consumer price level, the presence of a research hub, and rainfall. This further suggests that regional factors are important.

- In one of the historical behaviour models, the dummy variable for whether a local unit has previously relocated or not is statistically significant and positive i.e. those that have relocated in the past are more likely to relocate in the future. Furthermore, many of the other factors are insignificant within the models. This suggests that:
  - the previous relocation dummy is picking up the effects of the other explanatory variables (i.e. the variables that were found to be significant in other models are still significant, but their effect is incorporated into the previous relocation variable); and/or
  - the previous relocation dummy is picking up an unobserved characteristic that is not reflected in the other variables, such as an inherent or underlying propensity to relocate.
- In addition to the previous relocation dummy, whether a local unit experienced significant contraction in its employment over the last 10 years is also statistically significant. Whereas, the other variables that reflect an increase in employment, and an increase and decrease in enterprise turnover, are insignificant. Only a contraction in employment, rather than an expansion in employment, may be significant if increases in employment generally come after a relocation (i.e. moves to allow for greater employment); whereas, firms may wait for a contraction to actually happen until downsizing.
- The sign and significance of explanatory variables is broadly consistent between the models estimating relocations between local authority districts, TTWAs and regions. This suggests that there is a degree of consistency in what is driving firms to relocate over different distances.

Figure 34: Sign and significance of models

	OLS models				Logit models				Random Effects models			Logit random effects models			Historical behaviour models		Different geographic area models	
Model	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Manufacturing	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	0	0	-1	-1
Information and communication	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	-1	0
Financial and insurance activities	-1	-1	-1	0	-1	-1	-1	0	0	0	0	-1	-1	0	0	0	-1	-1
Professional, scientific and technical activities	-1	0	0	0	-1	0	0	0	0	0	0	-1	0	0	1	1	-1	-1
Number of employees	-1	-1	-1	0	-1	-1	-1	0	-1	0	0	-1	-1	-1	0	0	0	-1
Turnover	1	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	1
Birth year	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Single site enterprise	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	-	1	1
Number of local units	-1	-1	-1	0	-1	-1	-1	0	0	0	-1	-1	-1	-1	0	0	-1	-1
Wage level	0	0	0	0	1	1	1	0	0	0	1	1	1	1	0	0	0	-1
Consumer price level	0	0	0	0	-1	-1	0	0	-1	0	0	-1	-1	0	0	0	0	1
GVA per head	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	0	0	-1	-1
Rural	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	-	0	0
Russell Group university	0	0	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	0	-1	-	0	0
Index of Multiple Deprivation	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	0	0	-1	-1
Rainfall	0	0	0	0	-1	-1	-1	0	0	0	0	-1	-1	-1	0	-1	0	0
Post crises	0	1	1	-	1	1	1	-	0	1	1	1	1	1	-	-	0	0
Time trend	0	0	-1	-	-1	-1	-1	-	0	-1	-1	-1	-1	-1	-	-	0	0
North East	-1	0	0	0	-	-	-	-	-1	0	-	-	-	-	-1	-	0	-1
North West	-1	-1	0	0	-	-	-	-	-1	-1	-	-	-	-	0	-	0	-1
Yorkshire and the Humber	-	-	-	-	-	-	-	-	-1	0	-	-	-	-	-	-	-	-
East Midlands	-1	0	0	0	-	-	-	-	-1	0	-	-	-	-	0	-	0	-1
West Midlands	0	0	0	-	-	-	-	-	-1	0	-	-	-	-	-	-	0	-1
East	0	0	0	0	-	-	-	-	-1	-1	-	-	-	-	0	-	0	-1
South East	0	0	0	0	-	-	-	-	-1	0	-	-	-	-	0	-	0	-1
South West	-1	-1	0	0	-	-	-	-	-1	-1	-	-	-	-	-1	-	0	-1
Wales	-1	0	-	0	-	-	-	-	-1	0	-	-	-	-	0	-	0	-1
Scotland	-1	-1	-	0	-	-	-	-	-1	0	-	-	-	-	0	-	-1	-1
Northern Ireland	0	0	-	0	-	-	-	-	-1	-	-	-	-	-	0	-	0	-1
Immediate foreign owner	-	0	0	-	-	0	0	-	-	0	0	-	0	0	-	-	-	-
Commercial property prices	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-	-	-
Travel time to closest railway station	-	-	0	-	-	-	1	-	-	-	0	-	-	0	-	-	-	-
Travel time to closest airport	-	-	-1	-	-	-	-1	-	-	-	0	-	-	-1	-	-	-	-
Travel time to closest road junction	-	-	1	-	-	-	0	-	-	-	0	-	-	0	-	-	-	-
Employment expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-
Employment contraction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
Turnover expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-
Turnover contraction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-
Pevious relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-

Note: 0 denotes insignificant, -1 negative, 1 positive.

Conclusions and limitation from analysis of IDBR

Here, we discuss the key conclusions from our analysis, and the limitations of the research.

The analysis presented in the above sections shows that:

- The IDBR can be used to identify instances of firm relocation. From our literature review, we are not aware of the IDBR being used in this way before, and therefore this research is new and innovative. Furthermore, as discussed below, it means that there could be opportunities for further research.
- Meaningful econometric models can be estimated based on data from the IDBR. We show that factors identified in our conceptual framework and previous studies appear to be significant drivers in the relocation choices of current UK firms.

However, following on from the above, there are also limitations in our econometric approach. Firstly, there may be missing variables in our models. That is, factors that drive relocation choices but that aren't captured in our models. If these factors are correlated with the explanatory variables that are included within our models, our results may be biased. Missing variables could include factors such as:

  - future 'physical' expansion or contraction plans (i.e. a significant change in staff numbers or space needed for production equipment);
  - low profitability (in part driven by property costs);
  - the expiry of an existing lease; and
  - dissatisfaction with 'very local' factors related to the current location (e.g. parking, traffic congestion, and the reputation of an area).

Secondly, there is likely to be a high degree of collinearity between our explanatory variables. This makes identifying and assigning causality more challenging. If multiple variables are very closely correlated, the econometric approaches will struggle to 'untangle' which factors are causing differences in behaviour. For example, the regional wage level and the regional consumer price level are highly correlated with each other, and therefore it would be inherently difficult to say which one is having an effect.

This is likely to be a particular challenge in relation to location characteristics. It is reasonable to expect that attractive locations have perform well across a number of characteristics, whereas less attractive locations may perform poorly across the same set of characteristics.

Furthermore, different drivers are likely to be jointly determined, which makes assigning causality even more challenging. For example, locations that are generally attractive to individuals may have higher consumer prices due to higher demand. Whereas, high consumer prices by itself is likely to negatively affect the appeal of an area. The

correlation between higher consumer prices and the general attractiveness of an area, however, may get picked up in econometric models.

Related to the above, there are a variety of other location variables that could have been included within our analysis, but that could be expected to be highly correlated with those that we did include. These include, for example: house prices; quality of local schools; broadband speeds; temperature; and air quality.

Care should also be taken in comparing the results of the econometric analysis with the results of the interviews. Our econometric analysis focuses on inter-TTWA relocations and uses some variables defined at regional levels (for both practical and 'design' reasons); whereas the interviews include some relocations over shorter distances, and drivers at all levels of granularity were explored. For example, 'very local' transport issues, such as parking, were mentioned a few times as drivers for the choice to relocate – but are not reflected in our econometric modelling. As explored further subsequently, this limitation could be addressed by future research.

7. Conclusion and ideas for future research

In this final chapter of our report we highlight some of the main findings from across the research that we have conducted and briefly discuss ideas for future research.

Main research findings

Our work consisted of first developing a conceptual framework, and then using this to conduct three research tasks. The conceptual framework, as summaried by Figure 1 in the executive summary: provides a definition of 'firm relocation'; identifies categorisations and decision-making stages; sets out established theories; specifies potential drivers of relocation; and identifies key dimensions of variation. We used the framework to scope and develop the three research tasks, the findings of which are discussed below, along with a comparison of drivers identified in the different tasks.

Literature review of existing empirical evidence

Academic literature has concluded that the primary reason firms choose to move from their current location is to allow for expansion, whereas cost savings and government policy are secondary drivers (Brouwer et al., 2004; Pellenbarg et al., 2002; Hayter, 1997; Chan et al., 1995). It has been found that although the propensity to move among all firms is low, the probability does vary based on firm characteristics. For example, studies have found that firms are more likely to move if they: have recently merged or been acquired; are small; have relatively few fixed assets; and serve national or international markets.

Academic papers tend to focus on particular drivers, types of firm, or types of relocation, and therefore it is more challenging to draw broad conclusions about the relative importance of different factors in terms of the drivers of location choice i.e. where a firm moves to. Distance from original location is often found to be a significant driver in the choice of where to relocate to (de Bok and van Oort, 2006); along with the availability of skilled labour, access to transport, and quality of life.

Drivers of relocation choice have also been found to vary by firm characteristics. Smaller firms are more likely to base location choices on personal preferences (Stam, 2007; Greenhalgh, 2008) and retail and professional services firms place more weight on access to transport (de Bok and van Oort, 2006).

Interviews

Consistent with the academic literature, the results of the interviews we conducted suggest that firms most often relocate to expand. However, firms that we interviewed often gave multiple reasons for why they chose to move from their current location. Other 'internal' factors, such as proximity to customers, accessibility for staff, the condition of the current property and lease conditions were sometimes given as contributing factors. Furthermore, it was common for very local and site-specific reasons, such as the availability of parking, to be highlighted as 'push' factors.

When firms do relocate, we heard that they have to exercise a degree of commercial judgement in choosing where to move to. That is, there is usually no clear 'best' choice. Some firms, particularly smaller ones, make location choices based on personal preferences of key decision makers. We found that larger organisations were more likely to undertake a systematic decision-making process, and make more 'objective' choices. Smaller firms were more likely to relocate based on individuals' personal preferences, such as where an owner lives.

Overall the interviews suggest that access to transport is the most important factor in the choice of location. It was important for most firms in terms of staff getting to and from work; important for many firms for customer access; and important for some manufacturing companies to transport their products.

Econometrics

Our econometric analysis also suggests that a range of variables affect relocation decisions, such as industry, the age of a local unit, the number of staff it employs, and Gross Value Added (GVA) per head in the local authority district. Whereas, factors including regional commercial property prices were not found to be significant drivers in the models. This may be because the effect may be being masked by other variables that are both specified at the same geographic level and closely correlated.

Overall, our models only explain a small proportion of firm behaviour, which is consistent with 'internal' factors that weren't included in the models due to data limitations (such as expansion plans) driving much of the decision to relocate.

Comparison of effect of drivers of firm relocation across the literature, econometric analysis and interviews

In Table 11 that follows, we compare the sign of key drivers of firm relocation across the three main elements of research undertaken in this study. As can be seen, there is a high degree of consistency between the results of the different research tasks. 'N/A' is used where a variable was not included in the econometrics or there isn't sufficient evidence from the interviews to draw a firm conclusion.

Table 11: Comparison of effects of variables across the literature, econometric analysis, and interviews

Driver	Effect	Example literature	Consistent with Econometrics	Consistent with Interviews
Expansion / contraction	Significant changes in size **increase** propensity to relocate	Brouwer et al. (2004); Pellenbarg et al. (2002); de Bok and van Oort (2006)	✓	✓
Merger / acquisition	A recent merger or acquisition **increases** propensity to relocate	Brouwer et al. (2004); Strauss-Kahn and Xavier (2006)	**N/A**	✓
Size	**Smaller** firms are **more likely** to relocate	Brouwer et al. (2004); Pellenbarg et al. (2002); de Bok and van Oort (2006)	✓	**N/A**
Industry	**Manufacturing** and **retail** firms are **less likely** to relocate	Pellenbarg et al. (2002); Pennings and Sleuwaegen (2000)	✓	**N/A**
Previous relocation	Firms that have recently moved are less likely to relocate again in the near future, but more likely to relocate in the distant future	Hu et al. (2008)	✓	✓
Age	Older firms are **less likely** to relocate	Sleutjes and Volker (2012); Brouwer et al. (2004)	✓	**N/A**

Driver	Effect	Example literature	Consistent with Econometrics	Consistent with Interviews
Single- or multi-site	Single-site firms are **less likely** to relocate	Brouwer et al. (2004)	✗	**N/A**
Property ownership	Firms that own property, rather than renting it, are **less likely** to relocate	Risselada et al. (2012)	**N/A**	**N/A**
Lease expiry	A recently expiring lease **increases** the propensity to relocate	Greenhalgh (2008); Schmidt (1979)	**N/A**	✓
Markets served	Firms that only serve **local markets** are **less likely** to relocate	Brouwer et al. (2004)	✓	✓
Transport	Firms with good access to transport are **less likely** to relocate	de Bok and van Oort (2006)	✗	✓

Ideas for future research

As set out below, we have identified a range of future research that could be conducted in relation to firm relocation behaviour.

- **Further analysis of the IDBR**. We have identified further analyses that could be conducted in relocation to firm relocation using the IDBR, as follows.
  - **Enterprise level analysis**. Whereas we have focused on local units, further analysis could be conducted at the enterprise level. Such analysis could focus on the location choice of multi-regional enterprises i.e. those with sites in more than one region. The purpose of this research would be to better understand the choices of companies that are more likely to have the ability to place sites anywhere across the UK. Such companies may be particularly attractive from a

policy perspective because they have the flexibility to make investment decisions at a national level, but that affect local areas.

  - **More localised analysis**. The focus of our analysis has been on inter-TTWA relocations, although we have also considered movements between local authority districts. Given the IDBR captures the postcode of each firm, and we know from other aspects of our research that relocations are often driven by very local factors, there is scope for more localised research. This could include defining location characteristics at the most granular level possible. Analysis could be conducted in terms of either the probability of relocation, or the probability of relocating to particular locations – such as lower super output areas. This research could be used to identify the relative importance of local features in retaining and attracting businesses, and support prioritisation decisions in public policy. For example, it could provide evidence as to the relative importance of factors such as parking, access to train stations, and broadband provision.

  - **Targeted analysis of identified relocations**. A more qualitative analysis could be conducted of enterprises of local units that have been identified as relocating. As we find in the rest of this research, the choice of relocating is often based on very specific factors, and these could be explored in more depth in a targeted analysis.

  - **Analysis of additional financial-related independent variables.** Financial data could be collected for firms of interest, to explore company-specific factors that aren't available in the IDBR – such as profitability and capital intensity.

- **Use of ongoing surveys to collect new types of data**. A number of ongoing business surveys, which use the IDBR as a sample frame, could be used to collect new types of information from firms in relation to relocation decisions. This could include firm 'internal' factors, such as expansion plans, and the importance of different factors in a recent relocation.

- **International relocation**. This research has focused on firm relocations within the UK. Further research could be conducted that focuses on international relocations – both in terms of firms with a UK presence choosing to relocate abroad, and foreign firms choosing to relocate to the UK. The research could investigate why firms do, or do not, choose the UK, and what are seen as the relative strengths and weaknesses of different locations within the UK.

Appendix A

This appendix consists of an overview of our methodological approach to the literature review, along with summaries for each of the papers we reviewed 'in-depth'.

Approach to literature review

Our approach to the literature review was developed to identify:

- economic theories that conceptualise the drivers and decision-making processes related to firm relocations;
- a broad range of factors that influence firms' relocation decisions, including factors that are internal to the firm, external factors (e.g. taxes and public policies), and other 'soft' variables (e.g. proximity to manager's house); and
- a spread of literature relating to different types of firms and relocations.

To identify literature, we searched the internet based on keywords, including firm/company 'relocation', 'location', and 'migration'. We searched for research specifically about the UK.

In addition, we followed citations and references in the literature, and the BEIS steering group provided some additional papers.

Where possible, we have specified the magnitudes of the empirical findings. However, a number of papers do not report marginal effects from regression models, or enough information for us to calculate them. For example, some papers use probit models, report the model coefficients, but not the sample means required to calculate marginal effects. Others use logit models, but do not specify the units of the variables necessary to give meaning to the size of the model coefficients.

As is set out in the following section, we have conducted a detailed review of 33 papers. These summaries were used to synthesise the literature as it is presented in the main body of this report.

Summaries of reviewed papers

Table 12

The Firm Relocation Decision: An Empirical Investigation
Author(s): Brouwer, Aleid E.; Mariotti, Ilaria; van Ommeren, Jos N.
Date: 2004.
Journal: The Annals of Regional Science.
Theory: In general, there are two types of relocation, complete and partial relocation. Complete relocation is defined as 'the movement of an establishment from one location to another'. Partial relocation is defined as the set up of a 'new local unit' that is linked with a 'pre-existing unit'. The economic theories that study firm relocation are the neo-classical; behavioural; and institutional theories. The neo-classical theory assumes the firm is a profit maximising agent with complete information. The behavioural theory assumes firms have incomplete information and have bounded rationality, and accordingly could settle for less-than-optimal options. The institutional theory assumes that economic activity is socially and institutionally situated. Accordingly, a firm's location is the result of its investment strategies and its negotiations with other institutions in the economy.
Empirical work: • Data: firms with more than 200 employees from 21 countries (mainly European countries) from the Cranet Survey. • Time period: between 1997-1999. • Analytical method: logit model to estimate probability of relocation. This paper estimates the determinants of firm relocation behaviour in 21 counties during the period 1997-1999. The data used is from a survey that is sent to the most senior HR/personnel specialist in large (more than 200 employees) private and public firms in different countries. Based on 5,568 observations, the data suggests that 8%

The Firm Relocation Decision: An Empirical Investigation

of the firms relocated within a period of three years – which means that annual moving rate was equivalent to 2.7%.

The decision to relocate activities is modelled by means of a logit model that relates the probability to relocate in the period 1997–1999 to a set of explanatory variables. In particular:

$$\Pr(relocate_i) = \frac{\exp(X_i'\beta)}{1 + \exp(X_i'\beta)}$$

where X_i is a matrix of explanatory variables and β is a vector of coefficients. The explanatory variables included in the regressions are based on what the economic theories discussed above predict as factors influencing the decision process regarding relocation.

More specifically, the key modelling results are detailed below. As a logit model is used, the exponential of the regression coefficients gives that predicted change in probability from a one-unit change in the explanatory variable.

- *Age of the firm*. Older firms are less likely to relocate e.g. relative to firms younger than 30, those aged 30-80 are 13% less likely to relocate.
- Number of employees. Larger firms are more likely to be immobile e.g. firms with more than 1,500 staff are about 30% less likely to relocate than those with 200-500 staff.
- Sector. Service firms that belong to the knowledge-economy have the highest probability of moving – 33% higher than manufacturing firms.
- Size of market. Firms that only serve 'local markets' are 25% less likely to relocate than international ones.
- Region. Firms in North Europe have the highest probability to relocate.
- Type of organisation. Single-site firms (as opposed to international or multi-plant) have the lowest probability of relocating. For example, relative to a subsidiary of an international firm, a single-site firm is about 50% less likely to relocate.
- Increase/decrease in the number of employees. Firms that experienced more than a 5% change in the number of employees are about 50% more likely to relocate.

The Firm Relocation Decision: An Empirical Investigation

- Acquisition/merger/take over. Firms are about 25-85% more likely to relocate depending on whether it has recently been part of an acquisition, take over, or merger.

Table 13

What Makes Firms Leave the Neighbourhood?
Author(s): Weterings, Anet.
Date: 2012.
Journal: Urban Studies.
Theory: The model is based on the idea that firms change their location when they are dissatisfied with their current location. The author describes the firm's decision to move a result of a 'mismatch between the locational preferences of the firm and the characteristics of the current location, leading to locational stress'. Locational factors include real estate prices, congestion, local wages, number of amenities in an area, and the rate of crime and burglaries.
Empirical work: • Data: panel data from the Netherlands of about 108,288 firms in 686 neighbourhoods. • Time period: between 1999 – 2006. • Analytical method: complementary log-logistic function estimating the propensity of a firm to relocate. The data used in this paper is a combination of a Dutch business register and location data. Analysis was conducted at the site level, although the majority of sites were those of single-site companies. Relocation is identified based on changes in the postcode of a site from one year to another. The population was limited to all sites located in urban neighbourhoods where at least 500 houses were present in 1999 and that are not located in the inner city. Sites were allowed to enter the dataset and drop out of the dataset as they were 'born' and 'died'. The author modelled the event of relocation using the complementary log-logistic (cloglog) function: $$h(j,X) = 1 - \exp(-\exp(X'\beta + Y_j))$$ where *h(t,Xj)* is the hazard rate of a site in interval '*j*' given the scores of that site on all covariates in interval '*j*', *X* is a matrix of covariates, and Y_j is the baseline hazard rate.

What Makes Firms Leave the Neighbourhood?

Given that neighbourhood activities are expected to have different effects for different industries, the empirical analysis is done separately for 'business services', 'consumer services', and 'manufacturing and wholesale'. Indeed, the likelihood of relocation differs between industrial activities: the average percentage of sites that relocated was 5.5%, 1.5% and 4.4%, respectively for the aforementioned industries.

The following table compares the effects of the neighbourhood conditions that are shown to be statistically significant from the complementary log-logistic model. Specifically, it shows how the percentage of the base hazard rate will increase or decrease as a result of moving from the 25th percentile to the 75th percentile of a particular neighbourhood condition. Moreover, the firm size is included to allow for a comparison of the strength of effect of neighbourhood conditions and firm internal factor.

- Business services

Factors	Difference
Ln Size	-1.23%
Income	-6.05%
Presence Shops	-3.19%
Shops not in use	3.01%
Physical disorder	6.88%
Violence incidents	4.16%
Population density	13.61%
Ln # inhabitants	-2.27%

- Consumer services

Factors	Difference
Ln Size	-28.78%
Income	7.60%

What Makes Firms Leave the Neighbourhood?

Shops not in use	8.67%
Physical disorder	-8.39%
Violence incidents	14.02%
Population density	-4.07%
Ln # inhabitants	-2.35%

- Manufacturing and wholesale

Factors	Difference
Ln Size	-20.03%
Income	2.91%
Presence Shops	-9.28%
Shops not in use	4.43%
Burglaries	6.38%
Population density	14.51%
Ln # inhabitants	-2.20%

The above table shows that moving from the 25th percentile to the 75th percentile in the number of violence incidents increases the base relocation likelihood of a firm in the consumer services industry by 14% compared to a 4% increase for business services.

Similarly, other neighbourhood effects such as the number of shops, cafes and restaurants have a higher effect for consumer services than for business services- which could be due to the fact that neighbourhood condition can directly impact the performance of a firm in the consumer services industry, in comparison with business services where these conditions are more 'would-like' factors.

What Makes Firms Leave the Neighbourhood?

Firms in the manufacturing and wholesale industry also prefer more vibrant neighbourhoods, such that a movement from the 25th to the 75th percentile in the presence of shops in a neighbourhood would decrease the base relocation likelihood of firms by around 9%. Moreover, manufacturing firms appear to be particularly influenced by the number of burglaries regarding their relocation decision, where an increase to the 75th percentile in the number of burglaries would increase the likelihood of relocating by around 6%.

With respect to the size of the firm, in all industries the result show that smaller firms are more likely to relocate than larger firms.

In the following we summaries the direction of the neighbourhood conditions on the likelihood to relocate for each of the industries separately.

In the case of business services, the results are as follows.

- Physical disorder (litter on the street; dog faeces on streets and sidewalks; vandalism of phone booth or bus stops; and graffiti on walls and buildings). Businesses located in neighbourhoods with higher physical disorders are more likely to move.
- Average household income. Businesses located in a neighbourhood with higher average income are less likely to move.
- Number of shops, cafes and restaurants per 1,000 inhabitants. The higher the concentration of amenities, the lower is the propensity of a business to relocate.
- Share of shops, cafes and restaurants that are not in use. A higher share can lead businesses to leave the neighbourhood.
- Number of violent incidents. The higher the number of violent incidents in a neighbourhood, the higher the propensity to relocate.

In case of consumer services, the results are as follows.

- Physical disorder. Positive effect on the propensity to relocate.
- Average household income. The higher the average income, the higher the propensity to leave the neighbourhood, due to increases in real estate prices- as one possible explanation.
- Number of shops, cafes and restaurants per 1,000 inhabitants. The higher concentration, the lower is the propensity of a consumer service business to

What Makes Firms Leave the Neighbourhood?

relocate. The variable has a larger impact on consumer services compared to business services (15.3% compared to 3%).

- Share of shops, cafes and restaurants that are not in use. The lower the share, the higher the propensity to leave the neighbourhood.
- Number of violent incidents. The effect of this variable is considerably larger for consumer services than it is for business services.
- Number of burglaries. Negative effect on the propensity of moving. One explanation is that the number of property crimes naturally increases when the concentration of consumer services increases.

In case of manufacturing and wholesale, the results are as follows.

In general, relocation decisions of manufacturing and wholesale firms are less affected by neighbourhood conditions than are the decision of firms in the business and consumer service industries. The factors that are found to matter for manufacturing and wholesale firms when making a decision regarding relocation are as follows.

- Number of shops, cafes and restaurants per 1,000 inhabitants. Negative effect on the propensity to relocate.
- Number of burglaries. Positive effect on the propensity to move.
- Population density. Positive effect on the propensity to move, an indicator that the availability of 'room for expansion' is an important factor to manufacturing firms compared to factors relating to the safety of the neighbourhood.

Table 14

Firm relocation: state of the art and research prospects.
Author(s): Pellenbarg, Piet H.; van Wissen, Leonardus; van Dijk, Jouke.
Date: 2002.
Journal: Groningen: University of Groningen, SOM research school.
Theory: In the theoretical framework of the paper the relocation process is separated into two stages, the first is taking the decision to move and the second is, upon taking the first step, the decision as to where to relocate. Relocation theories are concerned with both 'pull' and 'push' factors. The pull factors are the locational factors that makes a location attractive to a firm, and the push factors are the factors that 'push out' a firm of its present location. The three types of relocation theories are: neo-classical, behavioural, and institutional. Neo-classical approach: the firm is a profit maximising agent with full information and rational behaviour. Neo-classical theories are useful in determining where the firm chooses to relocate (pull factors), but cannot explain why a firm might chooses to move (push factors). The neo-classical approach also does not take into account the internal dynamics and changes of firms. Behavioural approach: the firm has limited information and bounded rationality. It is described as 'largely descriptive and explorative and to a much lesser extent an explanatory model', as it focuses on the 'soft' variables while ignoring the economic factors. Institutional approach: this approach looks not only at the firm as an active decision-making unit but also on the firm's social and cultural context. Here, firms have to 'negotiate with deliverers and suppliers, local, regional or national governments, labour unions and other institutions, about prices, wages, taxes, subsidies, infrastructure, and other key factors in the production process of the firm'. Examples of institutions that firms interact with include governments and real estate markets.
Empirical work: • Data: panel data of firm relocation in the Netherlands – survey on stated preferences of firms and their probability of moving. • Time period: between 1996 – 1997.

Firm relocation: state of the art and research prospects.

- Analytical method: ordered logit model based on stated preferences of firms.

This paper qualitatively discusses the results of the empirical analysis conducted in a separate paper. It focuses on whether the signs and significances of the estimated coefficients are consistent with theory, but it does not specify the magnitude of the estimated coefficients.

The analysis is based on a survey of firms, in which they were asked to indicate the probability of moving in 1996 or 1997. They could choose from the following categories: 0%, 0-10%, 10-25%, 25-50%, 50-75%, 75-90%, 90-100% and 100%. With these eight categories the dependent variable y =PMOVE took values between 0 and 7 – and as such an ordered logit model was used. Of all firms, 60% answered that they will certainly not move in the next two years. Almost a quarter showed a propensity to move of less than 10%, and about 10% indicate that there is a chance of more than 25% that they will move to another location.

The explanatory variables of the econometric analysis are divided into three categories: internal factors; location factors; and firm external factors.

Firm internal factors: economic sector, firm size, previous migration behaviour.

- *Economic sector*. The authors hypothesis that the costs of moving are generally high for firms in the industrial sector, while they are only high for services firms if they choose to move over a long distance. The mobility of the construction, wholesale and transport sectors falls in-between the industrial and service sectors' propensity to move. In theory, retail and firms in the hotels and restaurants industry have a lower propensity to move compared to the industrial sector as they mainly serve local markets and prefer areas where there is a concentration of similar services. The data confirms the last hypothesis but no significant differences in the propensity to move are found for other sectors.

- *Firm size*. Theoretically, smaller firms will have a higher propensity to move compared to larger firms. While the empirical results did not show significant differences for most categories, it did show that small firms (specifically firms with less than 10 employees) do have a higher propensity to move.

- *Previous migration behaviour*. Theoretically, if the firm has moved in the past, then this might reduce the necessity to move again. The empirical results confirm the hypothesis that firms who have recently relocated are less likely to relocate again.

Location factors: site and situation.

Firm relocation: state of the art and research prospects.

- 15 different variables were included here to capture location characteristics such as the types of enterprise zones, and whether the firm is located in the city centre or at city borders. The empirical model did not show significant results for any of the infrastructure variables that aim to capture transportation links. The data confirms the hypothesis that owners of the building are less likely to move than firms who rent the building. Firms in industrial sites for heavy industry have a lower propensity to move.
- Another set of variables included here capture changes in the internal and external dynamics of a firm that might lead it to relocate. These variables include the growth in the number of employees, the increase in the number of crimes in the area, and changes to government policies. These variables are combined into an index and the empirical results show the coefficient for the index is statistically significant.

Firm external factors: variables capturing regional economic performance, and firms' perspectives on government policies.

- The empirical results support the theoretical hypothesis and show that firms in the periphery have a higher propensity for relocation compared to firms in the economic core area.
- The empirical results do not show a significant relationship between firms' opinions about governments' policies (EU policy, national policy, regional and local policies) and its propensity to move. Specifically, firms here were asked to state whether they perceive governments' policies as 'attractive' and 'positive' or otherwise.

Table 15

Regional Business Climate and Interstate Manufacturing Relocation Decisions.
Author(s): Conroy, Tessa; Deller, Steven; Tsvetkova, Alexandra.
Date: 2015.
Journal: Regional Science and Urban Economics.
Theory: The theory models the firm as a profit maximising agent. A firm will decide to relocate if the expected profits of relocating to a different region exceeds the firm's current profits, and when the difference between the expected profits in the new region and the expected profits in the current state is maximised. The firm's profit is a function of its output, the prices of inputs, the level of taxes, and the level of public services.
Empirical work: • Data: manufacturing firms that changed location in the USA. • Time period: between 2000 – 2011. • Analytical method: Negative binomial estimator. This paper models interstate relocations for manufacturers in aggregate and for three sub-groups characterised by their industry-level R&D intensity. The analysis suggests that very few manufacturing firms relocate across state lines in any given year and the vast majority of those that do are small in size and move to adjoining states. The results also reveal that interstate migration by manufacturing establishments varies with their R&D intensity. Whereas a number of factors considered in this study are statistically significant, marginal effects at the mean are infinitesimal. The authors suggest that this means that states attempting to encourage manufacturing firms to relocate from other states via traditional perspectives on business climate are unlikely to be successful. The paper models the flows of firms from one state to another. In particular, it estimates: $$M_{ij,t} = \sum_{l=1}^{L} \theta_l \Delta x_{l,ij,t} + N_{ij} + T_t + \varepsilon$$

Regional Business Climate and Interstate Manufacturing Relocation Decisions.

where $M_{ij,t}$ is the flow of firms from state *i* to state *j*, $\Delta x_{l,ij,t}$ is the difference between state *i* and state *j* across a set of *l* empirical variables in year *t, N* is a dummy variable equal to one if states *i* and *j* are neighbours, and *T* is a time fixed effect. To allow for the presence of unobserved heterogeneity, the authors estimate the above equation using the negative binomial estimator.

There are 8,750 origin-destination state pairs with positive relocation counts over the study period. There is just one firm moving between about 50% of the origin-destination state pairs in any given year. Whilst the flows are highly skewed towards low numbers, the largest relocation count is 62 firms that moved from New York to New Jersey in 2009. Overall, movement from New York to New Jersey accounts for the five largest annual relocation flows.

The empirical model divides manufacturing companies into low, medium, and high R&D intensity companies. The rationale is that the level of innovation which is proxied by the level of R&D in an industry is related to its 'maturity'.

The empirical findings are summarised below. The authors state that the margin effects of the significant variables are very low, which is likely to be explained, in part, because of the rarity of manufacturing relocations.

- *Share of a state's manufacturing GDP to total USA manufacturing GDP*. Medium and high R&D intensity companies are more likely to migrate to states with lower shares of manufacturing.
- *Agglomeration (share of employment in manufacturing)*. Firms are more likely to migrate from states with low agglomeration to firms with higher agglomeration rates.
- *Rate of union membership*. Firms of all levels of R&D intensity tend to leave states with high union memberships to states with lower union membership. Relatedly, conditions of the labour market such as the unemployment rate or the share of graduates do not have an effect on a firm relocation decision.
- *Energy costs*. Firms of all levels of R&D intensity tend to migrate to states with lower electricity prices, but the results are weakly significant.
- *Taxes*. The influence differs by type of tax and R&D intensity of the firm. Firms with high intensity of R&D tend to migrate to states with lower rates of corporate income taxes, and higher property taxes. Firms in states with high income taxes tend to migrate to states with lower income taxes.
- *Government spending on services*. This set of variables particularly influence the decision of firms with low and medium R&D intensity. Low R&D intensity firms tend

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to migrate to states with higher government spending on high education. Moreover, low and medium R&D firms tend to migrate from states with low welfare spending to states with high welfare spending.

- *Business and political environment*. An index capturing the competitiveness of states does not influence the decision of firm relocation as is shown by the empirical estimates.

Table 16

An Examination of Business Occupier Relocation Decision Making: Distinguishing Small and Large Firm Behaviour.
Author(s): Greenhalgh, Paul.
Date: 2008.
Journal: Journal of Property Research.
Theory: The authors are interested in modelling the decision-making process with regard to relocation. The process is modelled in a three-stage decision model, the trigger, the analysis, and the outcome. The trigger involves variables such as expansion pressure, where the analysis involves factors such as who to involve in the process or what factors to consider. The outcome includes the optional choices and the factors that influence the final outcome.
Empirical work: • Data: 28 firms in Tyne and Wear in England. • Time period: 2008. • Analytical method: 'constant comparative method' used to analyse the output of the interviews. The constant comparative method combines 'inductive category coding with a simultaneous comparison of all units of meaning'. The common themes/factors that are taken into consideration while making a decision on relocation, as mentioned in the interviews are: • Improved performance, growth and expansion; • Access, location, proximity to staff and customers; • The influence of public sector intervention; • Tenure; • The contribution of property to business performance; • Structure, changes and rules;

An Examination of Business Occupier Relocation Decision Making: Distinguishing Small and Large Firm Behaviour.

- Market perceptions;
- Property characteristics;
- Time and chance.

Important differences were noted between the behaviour of large and smaller firms. For example, large firms tend to base their decisions on outcomes of sophisticated processes that take into consideration multiple factors. Whereas decisions of smaller firms are usually described as being made on 'gut feeling' rather than being based on any processes that take into consideration all the relevant variables. Moreover, small firms are found to rely more heavily on their external networks and relations due to their bounded local market knowledge.

Most interviewed firms restricted their choices to areas that they knew well. In the case of small firms, they had a tendency to locate in an area that is close to their own homes (founder's home), while large firms placed greater importance on locations with wider accessibility. A general distinction is made between: local manufacturers and service providers that need to retain their trained staff and have loyalty to their local area; professional service sector firms to whom clients' needs are paramount; and more footloose activities such as call centres that will go where they can get cheap and plentiful labour.

Regardless of firm size, the perceptions and priorities of key individuals in an entity are likely to influence the final outcomes.

Table 17

Understanding Firms Relocation and Expansion Decisions Using Self Reported Factor Importance Rating.
Author(s): Hu, Wuyang; Cox, Linda J.; Wright, Joan; Harris, Thomas R.
Date: 2008.
Journal: The Review of Regional Studies.
Theory: The paper combines the variables that are traditionally studied under each of the neo-classical, behavioural, and institutional theories. Specifically, it studies the relationship between the important variables as reported by firms, and the likelihood to relocate or expand. The paper also tries to differentiate between the factors that have influenced firms' decision about relocating in the past, and the factors that are likely to influence their decisions about relocation in the future.
Empirical work: • Data: a sample of 1,277 firms in the USA. • Time period: 2003 and 2006. • Analytical method: probit choice model estimating the effect of factors on firms' relocation probability in the past. Additionally, an order probit model to assess how likely is the firm going to relocate or expand in the future. The empirical work is based on the data from surveys distributed to firms. The survey covered the factors that were considered important by firms in their decision about relocation in the past, and the factors that are likely to influence their decision in the future. The purpose was to capture the continuum in firms' decision-making through taking into account the interaction between decisions across different points in time. Rather than collecting data on all variables that could be argued to influence the relocation decision, this paper takes the important factors as self-reported by firms. Of those that responded, about 60% stated that they had relocated or expanded in the last five years, and about 35% stated that they were 'likely' or 'very likely' to relocate or expand in the next five years. To estimate the probability that a firm relocated or expanded, the authors estimated: $$Prob(y_1 = 1) = \Phi(\boldsymbol{X_{ij}\beta})$$

Understanding Firms Relocation and Expansion Decisions Using Self Reported Factor Importance Rating.

where Φ is the standard normal distribution function, $\boldsymbol{X_{ij}}$ is a matrix of explanatory variables collected in the survey, and $\boldsymbol{\beta}$ is a vector of coefficients. A similar model was used to estimate the likelihood of future relocation or expansion.

Findings from the empirical analysis are as follows. Margin effects (i.e. the magnitude of the coefficients) are not reported by the authors.

- A negative correlation was found between firms that relocated in the past five years and their plans for relocating/expanding in the next five years. However, firms that have relocated in the past are more likely to relocate again in the future (further than 5 years) than firms who have not done so in the past.
- The results do not support the argument that firms in certain economic sectors such as manufacturing are more willing to relocate than firms in other economic sectors. The direction of the coefficient is the same for firms' past decisions on relocation as well their future decisions with regard to relocation.
- Firms internal factors such as annual sales and total employment are found to be insignificant.
- While the review shows positive relationships between the likelihood of relocating and variables such as access to fibre optic lines, speed internet and the possibility of future expansion, a statistically significant negative relationship has been found with variables such as access to international airport, low crime rate, and availability of quality healthcare – which suggest that firms who believe these are important relocation factors, were not as likely to relocate or expand as other firms.
- The variables that are found to have a significant impact on the decision of a firm to relocate are related to resource availability and technological support such as access to passenger air, and high-speed internet.
- The difference between a firm's past decision on relocation and the factors that are likely to affect its decision in the future is that firms put much stronger weights on factors such as skilled labour, local tax rates, and cost benefits in future decisions.
- It was also noted that while firms who considered the availability of high-speed internet an important factor were more likely to relocate in the past, when considering future decisions, this factor was unlikely to influence their decision on relocation.

Table 18

Why Butterflies Don t Leave. Locational behaviour of entrepreneurial firms.
Author(s): Stam, Erik.
Date: 2007.
Journal: Economic Geography.
Theory: The paper puts forward a conceptual framework for the decision process of the entrepreneurial firm relocation decision based on the different phases of the firm life course. Accordingly, the focus of the paper is to capture how the decision about relocation vary as a response to the development phase of a firm. In general, the paper attempts to constructs a theoretical model to explain 'why' and 'how' firms make location decisions, while accounting for a firm's resources, its relations with stakeholders both within and outside of the firm, and its stage of development. The development phases of a firm as set out in the paper are as follows: start-up; initial survival; early growth; growth syndrome; and the accumulation phase. The 'locational behaviour' of a firm refers to changing the spatial organisation of a firm as a result of the different development phases it goes through. Additionally, the theory differentiates between an 'opportunity-driven' and a 'problem-driven' decision on relocation.
Empirical work: • Data: 23 fast-growing firms from the professional; business services; biomedical; graphics-media; and shipbuilding industries in the Netherlands. • Time period: 1999. • Analytical method: analysis based on survey results. Data is collected on young fast-growing firms from the manufacturing and business service industries. In total, 128 locational events in the different development phases of a firm have been studied. Telephone surveys were conducted with the population sample. The conclusions from the surveys, per development phase are as follows. • Start-up: since the entrepreneur firm will not have generated any profits at this phase, the location choice is likely to be motivated by the entrepreneur's knowledge of locations; personal preferences; and networks.

Why Butterflies Don t Leave. Locational behaviour of entrepreneurial firms.

- Initial Survival: firms that have decided to move at this stage said that they did so because they needed a 'professional identity' or because they wanted to separate their private lives from their business. The places that firms move to are chosen on the basis that they are either: (i) recognisable as business centres; or (ii) are at close proximity to key customers. The decisions in this stage are still largely centred around the entrepreneur's preferences and recommendations from their network.
- Early Growth: a small group of firms will not only manage to survive but to also grow considerably (they move from being caterpillar to butterflies). If the firm at this stage decides to open other branches, then employees are also likely to be involved in the decision-making process. Firms will have in mind here the proximity to customers as an important factor. Additionally, firms will consider how large their sunk costs are, and the lower these sunk costs are, the more likely that a firm would consider relocating/expanding outside its local region.
- Growth Syndrome: not all firms will pass through this phase, but if they do, the response would be to close some branches and disinvest any further resources.
- Accumulation: firms that continue to grow enter this phase, and it is driven by the firm generating a surplus of resources or through realising new opportunities. A firm's decision at this phase is usually driven by new opportunities or by shortages of production space. Here it was concluded that larger firms are more likely to take the decision to move out of their homes because they become less dependent on other organisations and have more resources to do so than small firms.

Table 19

Immigration, Firm Relocation, and Welfare of Domestic Workers.
Author(s): Skiba, Alexandre.
Date: 2006.
Journal: 6th Annual Missouri Economics Conference Selected Papers.
Theory: The paper examines the link between immigration and relocation of production activities. The theoretical model that is used to examine the link between the two is a specific factors model, with two industries and 'specific' factors in each industry. The assumptions of the specific factors model with internationally mobile factors are as follows: a) Small country assumption. The assumption is made to abstract the effect of trade on prices. b) Some factors are particular to an industry. The implications of the assumption are such that the model discusses short-term rather than long run dynamins. c) Some factors are immobile across countries. d) Each domestic industry employs three factors: i) low-skilled labour, described as internationally immobile and specific to the industry; ii) high-skilled labour, described as internationally immobile and sector non-specific; and iii) entrepreneurial capital, described as internationally mobile and sector specific. e) The size of the firm is proportionate to the amount of entrepreneurial capital it employs. f) The model has two countries, home and foreign, such that the foreign country does not have a non-specific factor. g) The production function has constant returns to scale. The theoretical model achieves the following: (i) the link between relocation of production and immigrant inflow; (ii) the mechanism through which the inflow of immigrants can have an adverse effect on the returns to specific domestic labour; and (iii) the sufficient condition which indicates that labour inflow will lead to lower returns on industry-specific internationally immobile factors.
Empirical work: • Data: USA employees who have lost their jobs due to relocation (domestic or oversees relocation) of their firms.

Immigration, Firm Relocation, and Welfare of Domestic Workers.

- Time period: between 1996 - 2001.
- Analytical method: negative binomial fixed effects specification.

$$\Pr\left(Y_{it} = y \middle| \mu_{ij}\right) = Poisson\left(\mu_{ij}\right)$$

$$\text{where } \mu_{it} = \exp\left(\beta_0 + \mathbf{x}'_{it}\beta_{it} + \varepsilon_i + \varepsilon_{it}\right) n_{ij}$$

The main conclusion from studying the relationship between immigrant inflow and relocation is that there is a statistically significant and positive relationship between relocation from a state and the inflows of immigrants into that state. The result holds after controlling for time trend and business cycle variations across states. Additionally, the elasticity of relocation rates with respect to immigrant inflows is between 0.60 and 1.44, or in other words, when the immigrant inflows double into a state, the relocation rates from that state will increase anywhere between 60% and 144%.

Another finding from the empirical estimation is that there is a statistically significant and negative relation between an industry's employment of immigrants and relocation rates in that industry.

Table 20

Agglomeration Economies, Accessibility, and the Spatial Choice Behaviour of Relocating Firms.

Author(s): de Bok, Michiel; van Oort, Frank.

Date: 2006.

Journal: The Journal of Transport and Land Use.

Theory: The paper aims at understanding the extent to which relocation decisions are dependent on factors of accessibility and agglomeration economies. The types of agglomeration economies presented in the paper are as follows:

Source	Localization economies	Urbanization economies
Labor market pooling	Access to specialized labor market	Cost benefits from access to large labor market
Input/output sharing	Access to specialized suppliers	Cost benefits from access to customers
Knowledge spillover	Industry-specific	Between different industries or from scientific environment
	Marshall externalities	*Jacobs' externalities*

The theoretical approach of the paper is based on the New Economic Geography models. These models try to explain the distribution of economic activities not only through specific location factors but also imperfect competition and economies of scale. The conceptual model is a location choice model that control for firm characteristics as well as accessibility and agglomeration attributes.

Agglomeration Economies, Accessibility, and the Spatial Choice Behaviour of Relocating Firms.

Empirical work:

- Data: 5,116 relocated firms in the Netherlands.
- Time period: between 1988 - 1997.
- Analytical method: binary regression model capturing the probability of relocation, and the choice of relocating firms. The probability of a firm to relocate is a function of both its characteristics/attributes and its current location, as follows.

$$P_i^{\mathrm{RP}}(t) = \frac{1}{1+\exp\left[-\left(\beta_{0s}^{\mathrm{RP}} + \sum_{\mathrm{n}=1}^{N}\beta_n^{\mathrm{RP}} Y_{\mathrm{in}} + \sum_{\mathrm{m}=1}^{M}\beta_m^{\mathrm{RP}} X_{\mathrm{jm}}\right)\right]}$$

Where Yin is attribute n, and Xjm is attribute m of location j.

The empirical model focuses on five industries: manufacturing; construction; transport and distribution; producer services (banking and insurance); and consumer services (retail and personal services). Regression results for the probability of relocation are as follows.

- In general, the relocation probability is mainly a function of the firm's attributes. The variables firm size, age, and employment growth capture the life cycle of a firm. The results for the three variables are statistically significant and are summarised as follows: (i) young firms are more likely to relocate; (ii) larger firms are less likely to relocate; and (iii) firms show a positive coefficients for the absolute growth rate, which indicates that they are more likely to relocate if they are going through an expansion/contraction.
- Firms in more diverse locations (estimated as the diversity of firm population with the productivity diversity index) are more likely to relocate.
- Firms that are near motorway onramps are less likely to relocate, which is due to good accessibility to infrastructure.
- Relocation probability differ by industry with firms in the transport industry being the most mobile, and firms in consumer services (including NGOs and retail) being the least mobile. Specifically, relative to consumer services, the relocation probability increased by; 25% for manufacturing firms; 70% for construction firm; 100% for transport, warehousing and communication firms; and 110% for producer services firms.

Agglomeration Economies, Accessibility, and the Spatial Choice Behaviour of Relocating Firms.

Subsequently, the paper estimates location choice models for each of the five industries seperately. A mixture of accessibility and agglomeration factors are included and the coefficients are presented in the following table. A negative coefficient indicates that a firm attaches a negative disutility to the factor, and otherwise for a factor with a positive coefficient. Specifically, the estimated model is as follows.

- Firms in the producer services, transport, manufacturing, and construction sectors prefer locations where they are near other firms of the same sector.
- Firms in the producer services, consumer services, and transport sectors prefer urbanised economies. By urbanised economies the authors mean economies with good travel options for business travellers (measured by logsum business and commuting trips in the table below).
- Firms in the business services sector show high preference for locations that are at close proximity from highway entrance ramps and train stations which allow for convenient business trips by customers.
- Firms in all sectors studied in the paper show a statistically significant negative relationship between relocation distance and the choice of relocation.

	Business services	General services	Manufactur ing	Construction	Transport
Distance to original location	−1.88**	-2.24**	-1.76**	-1.93**	-1.62**
Near train station & highway-on-ramp	0.24**	0.15	-0.18	0.12	0.1
Near neither	-0.18	-0.44	-0.09	-0.21	-0.22
Logsum business and commuting trips	0.202**	0.164*	0.049	0.007	0.091*
Diversity	0.11	-0.31	0.09	0.09	0.32
Specialisation	0.45**	-0.18	0.55**	0.21**	0.37**
Centrality	-1.38**	-0.78*	-0.94**	-1.3**	-1.93**

Agglomeration Economies, Accessibility, and the Spatial Choice Behaviour of Relocating Firms.

**=significant at the 0.99 level; *=significant at the 0.95 level

Table 21

International relocation: firm and industry determinants.

Author(s): Pennings, Enrico; Sleuwaegen, Leo.

Date: 2000.

Journal: Economics Letter.

Theory: The paper does not present a theoretical framework before introducing the empirics.

Empirical work:

- Data: 372 firms from Belgium. Each firm had at least 20 employees. 14% of the firms have relocated.
- Time period: between 1990-1996.
- Analytical method: logit model estimating the probability of relocating out of Belgium.

The following table shows the host countries for each incidence of relocation in the sample.

Host country	No. of relocations	Host country	No. of relocations
France	12	**Russia**	2
Netherlands	7	**Austria**	1
UK	5	**Canada**	1
Germany	4	**China**	1
Tunisia	3	**Czech Republic**	1
USA	3	**Hungary**	1
Italy	2	**Malaysia**	1
Luxemburg	2	**South Africa**	1

International relocation: firm and industry determinants.

Poland	2	**Spain**	1
Portugal	2	**Total**	52

The empirical model focuses on the following industries: construction; trade; services; transport and communication; financial corporation; and other services and basic industries.

The explanatory variables added in the regression are: ratio of fixed capital to number of employees; ratio of sunk tangible assets to total tangible assets; industry dummy variable (where there is a differentiation between R&D and advertising intensive industries, and remaining manufacturing industries); profit to sales ratio; log of average turnover; value added to sales ratio (measure of complexity and degree of vertical integration); innovation index; uncertainty; increased competitive pressure index; and belonging to a multinational group dummy.

Results from the regression are consistent with the behaviour of a cost-minimising firm and are as follows.

- Firms with low capital to labour ratio (labour-intensive firms) are 25% more likely to relocate their activities from Belgium.
- Larger firms are found to be more likely to relocate their activities (especially if the firm has several plants).
- Profitable firms are more likely to relocate their activities as they have the capacity to absorb ‘cost adjustments of relocation’.
- If a firm belongs to a multinational group, the odds for it to relocate increase by a factor of 1.28 (specifically so for more profitable units).
- Uncertainty is negatively related with the probability of relocating- whether it is uncertainty in home or host country; whereas the relation with uncertainty is not statistically significant in the case of multinationals.
- The innovative index has a statistically positive relationship with the probability of relocation. If the company has accomplished a combined product and process innovation, its odds of relocating will increase by a factor of 1.47.
- The ratio of sunk tangible assets to total assets is not found statistically significant.

International relocation: firm and industry determinants.

- Manufacturing industries are found to have a higher propensity to relocate compared to market-oriented industries such as services.
- The complexity of a firm shows a negative relationship with the probability of relocation.

Table 22

Determinants of Firm Relocation A Study of Agro Food Processors.
Author(s): Persillet, Vanessa; Shonkwiler, J.S..
Date: 2013.
Journal: The Agriculture & Applied Economics Association AAEA & CAES Joint Annual Meeting.
Theory: Complete relocation is defined as 'the movement of one establishment from one location to another', which is mostly adopted by single-site firms. Partial relocation is usually adopted by larger firms or multi-plant firms who take advantage of the most favourable location for their different production processes. In general, there are three main categories of relocation, intra-regional; inter-regional; and international. The paper focuses on the latter two categories of relocation. The firm relocation decision as studied by economic theories is as follows. • The neo-classical explanation of firm relocation is cost-oriented, where a firm is assumed to relocate if there are changes in variables such as property taxes. • The behavioural explanation of firm relocation explores firm 'internal' factors such as age and size, and firms are analysed given the assumption that they have imperfect information. • The institutional and evolutionary explanation of firm relocation is through examining 'external' factors such as a firm's negotiations with governments about taxes and subsidies. These theories are combined to **'extended resource-based'** explanation for relocation. The extended resource-based theory differentiates between the following types of resources: (i) resources that are internal to the firm such as size and age; (ii) organisational; (iii) 'territorial embeddedness which generate relational resources'; and (iv) resources stemming from the region in which a firm is relocated. The paper also examines firm relocation responses to regional policies. For example, the neo-classical approach would advise 'cost-related' measures that 'push' firms through subsidies. On the other hand, approaches that are based on the behavioural and institutional theories focus on local factors and 'integrated development plans' that are delivered through cooperation between regional and local players.

Determinants of Firm Relocation A Study of Agro Food Processors.

Empirical work:

- Data: survey of 27 companies from the poultry and processed food industries in the West part of France. The poultry industries accounted for 73% of the total sales in the West region, and the processed food industries accounted for 54%.
- Time period: 2010.
- Analytical method: a system of probit equations.

Model specification takes into consideration the following characteristics: i) the binary nature of the relocation response; ii) the binary nature of variables indicating a firm's international sourcing and international product sales; and iii) the presence of an 'unobservable common factor' relating the relocation decision and the degree of involvement in international markets.

$$y^* = z_1\beta_1 + \xi\,\lambda_1 + \varepsilon_1$$

$$s^* = z_2\beta_2 + \xi\,\lambda_2 + \varepsilon_2$$

$$x^* = z_3\beta_3 + \xi\,\lambda_3 + \varepsilon_3$$

Where y* denotes the latent desire to relocate, s* denotes the intensity of international sourcing, and x* denotes the intensity of exporting.

Results from maximum likelihood estimation of the model are as follows.

- A positive relationship between being located near a large city and the probability to relocate.
- Larger firms are less likely to relocate.
- As the number of total employees increases by 10 employees, the absolute probability of relocation decreases by 2.7%.
- The internalisation of a firm (size of market) has a positive effect on its probability to relocate.
- Regional development policies that promote international trade might have a negative effect on the probability to relocate.

Determinants of Firm Relocation A Study of Agro Food Processors.

- Organisational embeddedness (defined by the firm's participation in external organisations and networks where the primary goal is mutual knowledge exchange and is measured by proximity to suppliers, research labs etc.), has a negative effect on the probability of relocation. In other words, if the firm has no active network, then the probability to relocate will increase by 41%.

Table 23

Onshoring.
Author(s): Cushman & Wakefield.
Date: 2016.
Journal: Cushman & Wakefield.
Theory: The short report does not discuss any theoretical models.
Empirical work: • Data: case studies from the UK. • Time period: not specified. • Analytical method: the analysis is based on case studies of firms' relocation. Case studies that are mentioned in the report are as follows. • Deutsche Bank relocating from London to Birmingham. The bank's head stated that the key factor for choosing Birmingham is the labour market as they were able to recruit highly skilled teams. • IBM locating in Manchester. One of the key benefits as mentioned by IBM's operations manager is the partnership with the University of Manchester and the ability to recruit a 'continuous stream of talented graduates' from the Computer Science department. • Royal Bank of Scotland (RBS) in Manchester. As explained by the Head of International Banking Services, the Manchester office has been an 'inspiring place to live and work'. Accordingly, RBS has been able to attract talented professionals who have found improvements in their quality of life where housing prices are affordable and commuting time is reduced (as compared to London). • Balfour Beatty's relocation to Quorum Business Park in Newcastle. One of the main reason was to attract the right talent. The firm was able to reduce the turnover rate from 20% to 5% in 3 years period. The short report states that besides incentives to cost-cutting that firms achieve when relocating from London, they also have incentives to form partnerships with universities to recruit and sustain top-talent. Cost-cutting is achieved through lower

Onshoring.
estate prices (as compared to London) and cheaper labour market. UK is also home to some of the best universities and the ability to build partnerships with these universities is a key strategy for firms who wish to recruit talented professionals.

Table 24

Where Do Firms Locate?
Author(s): O'Sullivan, Arthur.
Date: 2005.
Journal: Urban Economics.
Theory: The paper aims at explaining how the location of firms either generate new cities or cause existing cities to grow. The concentration of firms and the resulting concentration of employees in a city is explained by the *location theory*- what attracts firms to a specific region and where do firms choose to locate. The location theory assumes that the location decision of firms is based on profit maximisation. The location can have a direct impact on a firm's profits, specifically it could affect the costs and benefits to a firm through the following: (a) transportation costs of inputs and outputs; (b) benefits from being located within close proximity to other firms in the same industry (localisation economies); (c) benefits from being in a large city (urbanisation economies); (d) benefits from efficient public sector / policies. The types of firms by transportation costs as discussed in the theoretical model are as follows. • Transfer-oriented firms. Firms where transportation costs are the dominant factor to consider in their location decision. Accordingly, firms choose the location that minimises their total transportation costs (sum of procurement and distribution costs). • Resource- oriented firms. Firms that have 'relatively high costs for transporting their inputs.' A firm is classified as a 'resource-oriented firm' when the monetary weight of its transferrable input is higher than the monetary weight of its transferrable output. An example is a firm involved in cotton baling where the input (raw cotton) is more bulky than the output (baled cotton) (monetary weight of input is higher than monetary weight of output) and the firm will choose to locate near the cotton field. • Market-oriented firms. Firms that have 'relatively high costs for transporting their output to the market.' In choosing a location, the firm is involved in a 'weight-gaining activity in the sense that its output is heavier than its input' (i.e. output is relatively expensive to transport). The output of market-oriented firms is characterised by being bulgy, perishable, fragile, or hazardous, and the firm will choose to locate near its market.

Where Do Firms Locate?

In addition to transportation costs, the theoretical model discusses the interaction of labour market and location choices. Here, the author discusses how improvements in transportation methods (e.g. development of fast ocean ships and container technology have decreased transportation costs). Additionally, the improvements in production technologies have also helped in decreasing transportation costs through reducing the physical weight of inputs. These factors have caused firms to switch from 'transfer orientation to labour orientation'- or in other words to base their location decision on access to 'inexpensive local inputs rather than access to transportable inputs'. There are two characteristics to the labour market as described by firms: (a) labour move across cities in the long run; (b) instead of workers following the firm, the firm will follow the workers, who are attracted to places with amenities, and good weather.

Empirical work:

- Data: case studies from the USA and Mexico.
- Time period: not specified.
- Analytical method: the analysis is based on case studies of firms' location choices.

Case studies that are mentioned in the report are as follows.

- The semiconductor Industry. Transportation costs are unimportant in location decisions here, what matter are localisation economies and access to different types of labour (engineers and scientists; skilled technicians and manual workers; and unskilled workers). Semiconductor firms typically split their operation where (a) research and development occurs in the Silicon Valley because there is a large concentration there of similar firms (localisation economies); (b) manufacturing facilities are in places where there is good supply of killed manual labour, are attractive to engineers and technicians, and are at easy access to the Silicon Valley by air transportation; and (c) assembly facilities are located oversees where there is good supply of low-skilled workers.
- Japanese Automobile Firms. These firms tend to pick location where there are (a) large populations; (b) high density of manufacturing activity; (c) educated workforce; (d) good transportation links; (e) high wages; (f) high concentration of minority workers; and (g) they are at close proximity to Japanese-affiliated automotive assemblers.
- Mexican Garment Industry. Some activities such as marketing and design are subject to large agglomerative economies and are concentrated in one location.

Where Do Firms Locate?

Whereas activities such as assembly with smaller agglomerative economies are ‘dispersed to outlying areas’.

- Carpet Manufacturing. This is an example of localisation economies where out of the 20 carpet manufacturers in America, 16 are located in Dalton and 13 located nearby. Moreover, ‘support firms’ (supplier of intermediate goods) also located nearby.
- GM’s Saturn Plant. The availability of special subsidies and low labour costs were the important factors that the firm considered in determining its location.

Table 25

The Comparative Impact of UK Regional Policy on Foreign and Indigenous Firm Movement.
Author(s): Ashcroft, Brian K.; Ingham, Keith P.D.
Date: 1982.
Journal: Applied Economics.
Theory: Foreign and indigenous firm movement is modelled by a flow model. The model seeks to explain first firms' movement to the UK and then the decision to locate in a UK development area- in case of foreign firms. Similarly, indigenous firms are also involved in a two-step decision sequence, first the decision to relocate, and then where to locate to.
Empirical work: • Data: manufacturing firms. • Time period: between 1950 – 1971. • Analytical method: OLS to estimate the movement of foreign firms to the UK and the movement of indigenous firms in the UK. Weighted least squares to estimate the distribution of indigenous and foreign firms to the Development Areas (DAs). The dependent variables for the model showing movement of foreign firms to the UK is the rate of the number of moves in manufacturing to the UK - to the world production capacity measure, and the explanatory variables in the model are as follows. • UK GNP to capture market size of the UK (to capture demand of the product in the UK). • The difference between the net present value (NPV) of UK national investment incentives and those available in the Republic of Ireland (only Ireland is included because no data could be obtained for government incentives in other European countries). • An index presenting the Common External Tariff (EEC customs union)- which might divert investments away from the UK.

The Comparative Impact of UK Regional Policy on Foreign and Indigenous Firm Movement.

- Variable representing world investment in new capacity: linear time trend to proxy world production capacity.

The results of the estimation of the OLS flow model of foreign firms suggest that foreign firms are attracted to the UK because of its market size and the availability of industrial and regional incentives. On the other hand, foreign firms have been diverted to choose the UK as a location due to the creation of the EEC prior to Britain's entry, and the existence of favourable incentives in Ireland.

The dependent variable in the model explaining the distribution of foreign firms to the Development Areas is the rate of the number of foreign firms in manufacturing moving to the DAs - to the number of moves in manufacturing to the UK, and the explanatory variables are as follows.

- Availability of labour in the DAs as measured by the weighted unemployment rates.
- Financial incentives are estimated by three measures: (i) NPVs of the differential investment incentives available in the DAs as a whole; (ii) dummy variable to control for years when the Local Employment Act 1960 was operational; and (iii) an estimate of the NPVs of the differential investment incentives available in the SDAs compared with the DAs.
- Index of the intensity of the operation of the Industrial Development Certificate (IDC) policy.

Similarly, the model for movement of indigenous firms within the UK include the same explanatory variables and add a measure of labour supply constraint facing expanding firms in the UK (variation of the unemployment rates in the standard regions of the NDAs). Additionally, to estimate the distribution of indigenous firms to the DAs the same explanatory variables are used in the model- while of course changing the dependant variable.

- The financial incentives do not have a statistically significant effect on indigenous UK firm movement. Mobile firms in the UK relocate due to supply constraint on the expansion of capacity. The IDC policy is found to be effective here.
- The WLS models show that both foreign and indigenous firms are attracted to DAs because of availability of labour. The two types of firms differ in that indigenous firms are more influenced by the intensity of IDC control than are foreign firms, while foreign firms are more responsive to financial incentives available in the DAs

but not in the SDAs. In conclusion, indigenous firms are found to have a proportionately larger response to policies compared to foreign firms.

Table 26

High Technology Firms and Factors Influencing Transfer of R&D Facilities.
Author(s): Rabino, Samuel.
Date: 1989.
Journal: Journal of Business Research.
Theory: The paper does not discuss any theoretical models before presenting the empirics.
Empirical work: • Data: survey of 31 high-technology firms in New England, USA. • Time period: 1984. • Analytical method: OLS regression analysis based on survey results. The study looks at the factors influencing the relocation of R&D facilities from the US to foreign regions. Specifically, it aims at understanding the impact of US government policies on the international relocation of R&D facilities, as some of these policies might reduce firms' expectations with regard to returns, and induce them to relocate. Countries where US firms have established R&D facilities, or where they plan to expand to, are, in order of importance, England, Japan, West Germany, Canada, and France. • First, the author summarises the ratings of the factors from the survey, where it was found that infrastructure (political stability and availability of skilled workers) considerations are more important than tax incentives when making a decision on relocating an R&D facility. • Second, three different regressions are performed to study the relationship between the dependent variables (factors influencing the relocation decision) and the characteristics of firms. The dependent variables for each of the regressions are (a) stability considerations: respondents' concerns with regard to economic and political stability, and the availability of appropriate transportation facility; (b) financial and cost considerations: concerns regarding the availability of private funds in the foreign country, the interest rates, and the labour costs; (c) skill and competency considerations: demand of a skilled technical workforce and proximity to universities and metropolitan areas (where skilled workers are concentrated). The independent

High Technology Firms and Factors Influencing Transfer of R&D Facilities.

variables used in the analysis are: (1) sales; (2) share of R&D in foreign locations out of the total amount spent on R&D; (3) expectation about changes in foreign R&D share in the future; (4) length of time of operating overseas assembly/production facilities; (5) share of net income derived from foreign sources out of total income; (6) corporate philosophy regarding the management of R&D personnel abroad.

- Regression results show that the independent variables ‘sales’ has a high and statistically significant relationship with the dependent variables of all three regression, whereas the results for the rest of the independent variables are either low or statistically insignificant.

High Technology Firms and Factors Influencing Transfer of R&D Facilities.

- Subsequently, respondents were asked to allocate 100 points to a set of strategy considerations when evaluating a foreign location for their R&D facilities. The mode and mean for each strategy are presented in the following table.

Strategic consideration	Mode	Mean
Long-term corporate growth goals	50	32.8
Competitive considerations	25	21.7
The development of technical skills in a foreign location	10	14.5
Acquisition of a foreign business with existing R&D facilities	-	8.2
Existence of a foreign support laboratory (acting as a technical service centre and adapting US product technology and local conditions)	-	14.9
Past success in R&D activities abroad	-	9.10

- 'Long-term corporate goals' and 'competitive considerations', are found to be the most important strategic considerations.

Table 27

The Location and Employment Choices of New Firms: An Econometric Model with Discrete and Continuous Endogenous Variables.
Author(s): Carlton, Dennis.
Date: 1983.
Journal: National Bureau of Economic Research.
Theory: The theoretical model assumes the firm is a profit maximising agent. The firm choice of location is where its profits exceeds its profit in any of the alternative locations.
Empirical work: • Data: data on 89 new firms in the UK. • Time period: between 1967 – 1971. • Analytical method: model of the joint decision of where to locate and how much labour to employ. The empirical model presented here is a logit model that assumes error independence, and models the joint decision of a firm with regards to where to locate and how much labour to employ. Three industries are studies in the paper: (1) Fabricated Plastic products (SIC code 3079); (2) Communication Transmission Equipment (SIC code 3662); and (3) Electronic Components (SIC code 3679). The empirical results for the coefficients of the independent variables are as follows. • Energy costs (electricity prices) have a large effect for each of the three industries. A 1% change in electricity prices have the smallest impact on the probability of firms that belong to the 3662 SIC industry to locating to a particular place, as compared to other industries. The rationale is that SIC 3662 is the least energy-intensive industry. • The importance of agglomeration economies is largest for firms belonging to SIC 3079. • Availability of technical experts only matter for SIC 3662.

The Location and Employment Choices of New Firms: An Econometric Model with Discrete and Continuous Endogenous Variables.

- The unemployment rate in a region (a high rate might be desirable because it means it would be easier to recruit labour) is positive and statistically significant for SIC 3079, while it is negative for SIC 3662 and SIC 3679.
- Tax variables are small and statistically insignificant for all three industries. There are many possible explanations for why taxes do not seem to affect the birth of new firms. For example, it could be because of the 'immobilities of certain factors of production', 'taxes are totally borne by factors of production in terms of lower remuneration'.
- The variables measuring business climate does not enter positively or is statistically significant for any of the industries.

Table 28

Real Estate Determinants of Firm Relocation in Urban Residential Neighbourhoods.
Author(s): Risselada, Anne; Schutjens, Veronique; Van Oort, Frank.
Date: 2012.
Journal: Tijdschrift voor economische en sociale geografie.
Theory: The paper aims at investigating whether real estate characteristics are drivers of relocation. The theoretical framework differentiates between two types of factors affecting firm relocation decision. Internal factors are the characteristics of the entrepreneur or the firm such as firm size and sector. The external factors are classified into push factors (factors that 'push' a firm to take the decision to relocate) and pull factors (factors affecting the decision of where to relocate). Additionally, internal and external factors are either 'tangible' or 'intangible'. Tangible factors are objectively quantified, whereas intangible factors are preferences that reflect particular emotions or cultural values. Location theories that discuss internal factors are the neo-classical, the behavioural, and the institutional.
Empirical work: • Data: newly established firm in all residential neighbourhoods in Amsterdam. • Time period: between 2005 - 2008. • Analytical method: logit model. In general, the empirical results show that home-base-businesses are more likely to relocate than businesses located in commercial properties. Additionally, neighbourhood variables seem only to have explanatory power for small distance relocation (i.e relocation within the municipality of Netherlands as opposed to relocation within the Netherlands). The empirical results for the independent variables presenting property characteristics are as follows. • Firms in residential properties are more likely to relocate than firms located in commercial properties.

Real Estate Determinants of Firm Relocation in Urban Residential Neighbourhoods.

- Negative relationship between ownership of the property and the probability to relocate, ownership of the property will decrease the probability of relocation by around 24%.
- Firms that are located in real estate housing multiple tenants are more likely to relocate than firms that are the sole users of the property.
- Firms in larger properties are less likely to relocate than firms in smaller properties.
- In the case of home-based business, the age of the property has a negative effect on the probability of relocation in the case of residential properties and a positive effect in the case of commercial properties. (This is due to the fact that in Amsterdam, old residential properties are of higher quality). An increase in the age of the property will increase the odds of relocation for a home-based business by 5%.

The empirical results for the independent variables presenting firm characteristics are as follows.

- The older the firm, the less likely it is to relocate. This could be explained by the fact that young firms start in sub-optimal locations and are accordingly more likely to relocate.
- Firm size has a positive effect on the probability of relocation in the case of home-based businesses and a negative effect in the case of commercial properties.
- Firm growth has a small positive effect on the probability of relocation.
- Business service firms show a higher propensity to relocate compared to consumer service firms because they are less dependent on their local markets and have lower sunk costs. Consumer service firms are 24% less likely to relocate.

The empirical results for the independent variables presenting neighbourhood characteristics are as follows.

- Home-based businesses located in wealthier neighbourhoods have a slightly higher propensity to relocate than businesses in ‘economically weaker districts’.
- Firms that are located in neighbourhoods with some ‘liveability’ issues are more likely to relocate than firms located in neighbourhoods that are more liveable.
- Accessibility of the neighbourhood which includes distance to train station and distance to freeway have a minor effect of the likelihood of relocating.

Table 29

A Study of the Factors Influencing the Operating Location Decisions of Small Firms.
Author(s): Mazzarol, Tim; Choo, Stephen.
Date: 2003.
Journal: Property Management.
Theory: The paper does not discuss any theoretical frameworks before presenting the empirics.
Empirical work: • Data: 450 firms ranging from micro-businesses to large firms in Australia. • Time period: 2000. • Analytical method: statistical analysis of interviews and surveys conducted with SMEs owners. Three-step methodology was designed to study the factors influencing location decisions of firms of different sizes. The first stage is a series of face-to-face interviews with 22 firms dealing with industrial and commercial property sales. The second stage is telephone surveys conducted with owners of 450 firms of different sizes. The last stage comprised of focus group discussion of the findings from the first two stages between land developers, builders and landlords. The conclusions drawn from the first stage were as follows. • For large firms, the key drivers affecting location decision, by level of importance, are as follows: (1) proximity to freight terminals; (2) proximity to major transport routes; and (3) proximity to trade customers. • For small firms, the price of land is more of an important factor than it is for larger firms. • Small firms also care about the location's proximity to services for employees such as banks and food outlets.

A Study of the Factors Influencing the Operating Location Decisions of Small Firms.

- Another important factor defined by smaller firms is proximity to the following: (a) customers; (b) bulk suppliers; (c) key employees; (d) owner-manager's home.

The conclusions drawn from the survey which comprised firms in the wholesale and retail; manufacturing; construction; and transportation industries, are as follows.

- Smaller firms place significantly higher weight on proximity to customers and the manager's home.
- In locating in blocks that are larger than 2,500 square metres, medium and large firms are less likely to consider proximity to customers than small or micro firms.
- Medium and larger firms are more likely to place increased weight on proximity to freight terminals and population centres as their need for space increase.
- Small firms were more concerned about securing a location that is close to their homes.
- Transport and storage firms are less likely to place a large weight on accessibility to freeways and large population centres than firms in other industries.
- Firms in the wholesale, retail, and construction industries place larger weight on proximity to public transportation than firms in other industries.

Specifically, respondents were asked to rate each of the factors on a five-point scale, where 1 is strongly disagree and 5 is strongly agree. Two different analysis are presented, the first relates to the important factors at the current location, and the second relates to the factors influencing the relocation decision- as presented in the subsequent tables. The 'mean' for each of the factors across the different breakdowns of firm size are presented. Additionally, the paper tests whether the differences between the four sub-populations of firms in the table is statistically significant- as is shown in column 5.

A Study of the Factors Influencing the Operating Location Decisions of Small Firms.

Influencing factors "My firm's current location is important because"	Micro <5 [a] $n=252$ (mean)	Small 6-20 [a] $n=150$ (mean)	Medium 21-200 [a] $n=36$ (mean)	Large >200 [a] $n=12$ (mean)	ANOVA F
We are close to our customers	3.66	3.62	3.12	2.80	3.014*
We are close to our suppliers	3.08	2.90	2.70	2.90	0.880
It has easy access to key highways	3.48	3.45	3.48	3.22	0.142
It has easy access to major freeways	3.19	3.26	3.48	3.30	0.420
It is close to the CBD	3.10	3.25	3.44	3.10	0.879
It is close to key population centres	3.73	3.61	3.48	3.40	0.889
It is close to freight terminals	2.55	2.52	2.78	4.00	4.250*
It is close to where I live	3.54	3.15	3.32	2.30	4.356*
It is close to where key staff live	3.42	3.45	3.40	2.70	1.236
It is close to amenities	3.76	3.85	4.00	3.40	1.119
It is close to public transport	3.26	3.17	3.08	2.56	0.436

Notes: [a] Number of employees; * Difference between the four sub-populations was found significant at 0.05 levels

Influencing factors "My firm's decision to relocate is because"	Micro <5 [a] $n=61$ (mean)	Small 6-20 [a] $n=36$ (mean)	Medium 21-200 [a] $n=10$ (mean)	Large >200 [a] $n=1$ (mean)	ANOVA F
We need to get closer to our customers	2.25	2.22	1.80	1.00	0.716
We need to get closer to our suppliers	2.03	2.14	1.90	1.00	0.527
We need to get closer to key transport routes	2.15	2.47	2.30	1.00	0.984
Our current site is too small	2.87	3.39	3.60	4.00	1.723
We would like to own our own premises	3.82	4.00	3.20	5.00	1.333
We have been asked to move by landlord	1.68	1.58	1.60	1.00	0.360
We need to be closer to public transport	2.05	2.00	1.80	1.00	0.407
I want to be closer to where I live	2.51	1.89	1.90	2.00	2.325*
We need to be closer to key population areas	2.44	2.20	2.00	1.00	0.860
We are receiving complaints e.g. noise, dust	1.55	1.56	1.60	1.00	0.351
We need to be closer to freight terminals	1.90	2.00	2.30	1.00	0.679

Notes: [a] Number of employees; * Difference between the four sub-populations was found significant at 0.10 levels

The conclusions drawn from stage three are as follows.

The focus group discussed the differences that exist in the behaviour of small, owner-managed firms and larger 'footloose' firms. Specifically, they stated that the decision for SMEs was largely influenced by factors such as proximity to owner-manager home and proximity to amenities, and was less influenced by factors such as proximity to

A Study of the Factors Influencing the Operating Location Decisions of Small Firms.

transport routes. Whereas larger firms take a more ‘pragmatic’ approach and they placed high importance on factors such as the market, labour and transportation accessibility. Moreover, large firms operate through ‘a dedicated buying centre when undertaking industrial land purchase’. These centres provide resources and expertise with regard to location decisions.

Table 30

The R&D Location Decision of the Firm and the "Creative" Regions a Survey.
Author(s): Malecki, E.J.
Date: 1987.
Journal: Technovation.
Theory: The paper does not discuss any theoretical frameworks before presenting the empirics.
Empirical work: • Data: studies from the USA and Europe. • Time period: • Analytical method: literature review. The paper is a literature review on the location choices of R&D facilities and the establishment of 'creative' regions. The unique characteristics of R&D facilities and their reliance on scientists, directly affects firms' location choices. • The literature discusses the choices of labour market as a very important consideration for firms when locating their R&D facilities. Specifically, firms will need to locate their R&D facilities in locations where they could attract and maintain R&D workers. Surveys have shown that 'quality of life' is an important consideration for professionals and specialised workers. Quality of life includes measures of housing (quality and cost); cost of living; quality of health services; services and cultural facilities; quality of educational services; crime; climate and pollution. An additional consideration for R&D workers is the 'intellectual atmosphere' of a region which can be measured by the number of universities and the amount of research conducted in the area. • The literature reviewed finds varying extents to which quality of life factors affect the location decisions of individuals, and their relative importance. Some studies find that composite indices of quality of life are have a statistically significant effect on a city's attraction of individuals, whereas another cited study found that only the economic, health and educational dimensions were significant (and not the political, environmental and social dimensions). Furthermore:

The R&D Location Decision of the Firm and the "Creative" Regions a Survey.

- Ritti (1986), which is based on a survey of 4,582 US engineers, found that 82% ranked location ("Live in a location and community that is desirable to you and your family") as very important – the highest rated aspect tested.
- Business Week (1984) found that 'computer workers' ranked location as fifth most important factor – with "opportunity to learn new skills" the most important factor.

- Another important factor is the communication of ideas and minimising the costs of obtaining information. For scientists to interact with other researchers and manufacturing facilities, a firm would seek to locate its R&D facility in an area with good access to air transportation. Moreover, communicating ideas / information could be achieved when a firm is located next to organisations conducting similar R&D activities.

In practice, these two factors mean that firms usually favour large urban regions. Firms with centralised R&D reflects a 'centrally-run and tightly organised structure' where important function such as R&D are 'retained close at hand' - which means that they are always located near the firm's administrative headquarters. For example, 88% of American corporations have a R&D facility in the same metropolitan area as their headquarters, and similarly the cluster of British R&D pharmaceutical seems to be attributed to the location of firms' headquarters.

The author notes the interrelation of quality of life measures. For example, relatively high housing costs may be considered a sign of a growing, dynamic area that will attract, rather than repel, professionals.

Table 31

Start ups and Relocations: Manufacturing Plant Location in Portugal.
Author(s): Holl, Adelheid.
Date: 2004.
Journal: Regional Science.
Theory: In general, the decision of start-ups and relocating firms is such that they seek location where their profits are maximised. However, considerations on the importance of location factors differ across the two decisions. For example, as firms grow and serve several markets, their need for good transportation links increases. Additionally, the information and search costs are not the same for start-ups and firms that are already in the market. Search costs are high for start-ups and the entrepreneur typically chooses a familiar location in their place of origin. Whereas as firms grow they gain better knowledge and understanding of the potentials of different markets. Another difference between start-ups and growing firms is that start-ups usually prefer to locate in diversified areas to take advantage of knowledge spillovers while finding their ideal production process, whereas the latter prefers to relocate to more specialised areas.
Empirical work: • Data: 40,000 manufacturing plant start-ups and plant relocations in Portugal. • Time period: between 1986 – 1997. Over that period, 40,000 new manufacturing establishments opened in Portugal. Around 80% of all start-ups had less than 10 employees, while more than half of the relocating firms had more than 10 employees. • Analytical method: reduced form count data models (Poisson and negative binomial models) which study the probability of a municipality receiving a new manufacturing plant given a set of potential location factors. Fixed effects Poisson model estimated to control for area characteristics.

Start ups and Relocations: Manufacturing Plant Location in Portugal.

$$N_{jt} = \beta_o + \beta_1 POP_{jt} + \beta_2 ACC_{jt} + \beta_3 HERFIN_{jt} + \beta_4 IND_{jt} + \beta_5 PSERV_{jt}$$
$$+ \beta_6 WAGE_{jt} + \beta_7 LLFQ_{jt} + \sum_{r=1}^{4} \delta_r DMW_{jt} + \alpha_j + \varepsilon_{jt} \qquad (4$$

Where N (the dependent variable) is the number of new plants in a given municipality j; POP is municipality population; ACC is an index of potential population accessibility; HERFIN is the Herfindahl employment specialisation index; IND is industry share; PSERV is produced service share; WAGE is index of manufacturing wage; LLFQ is low labour force qualification; and α is municipality-specific fixed effects. In summary, three types of independent variables are included in the model: (i) municipality characteristics (NUTS5); (ii) wider labour market area characteristics (NUTS3); and (iii) measures of market size access and agglomeration economies, and factor costs and labour market characteristics.

The model is estimated separately for 'new plants resulting from births and new plants resulting from relocations'.

The empirical results of the Poisson fixed effects model are as follows.

- The local market size (estimated by population) has a significant influence on the number of predicted start-ups, but no significant effect on plant relocation.
- Relocation decisions are more strongly influenced by market accessibility, compared to start- ups.
- Municipalities outside the 10-kilometre motorway corridor receive both less predicted start-ups (31% less) and relocations (98% fewer).
- Lack of diversity in the region (as is measured by the Herfindahl index) has a significant negative effect on plan births, but an insignificant effect on their relocation.
- High wages decrease the number on new start-ups but have no significant effect on relocation decisions.

Start ups and Relocations: Manufacturing Plant Location in Portugal.

	Poisson fixed-effects		Negative binomial fixed-effects	
Variables	Firm births	Relocations	Firm births	Relocations
Municipality population: POP	0.257*	−0.176	0.167**	−0.250**
Market potential accessibility: ACC	0.121*	0.216*	0.040**	0.116*
Motorway access				
Distance 10–20 km: DMW_1	−0.151*	−0.246**	−0.110*	−0.263**
Distance 20–30 km: DMW_2	−0.312*	−0.977*	−0.233*	−0.799*
Distance 30–50 km: DMW_3	−0.232*	−0.639*	−0.173*	−0.435**
Beyond 50 km: DMW_4	−0.257*	−0.650*	−0.199*	−0.727*
Lack of diversity: HERFIN	−0.503*	−0.047	−0.480*	0.467
Industry share: IND	0.035*	0.180*	0.019	0.143*
Producer service share: PSERV	−0.016	0.090	0.014	0.458*
Wage: WAGE	−0.012*	−0.002	−0.009*	−0.007
Low labour force qualification: LLFQ	−0.055*	−0.092**	−0.021***	−0.095*
Observations	3300	2676	3300	2676
Log likelihood	−6283.68	−2229.37	−6098.70	−2120.25
Wald test	1058.09*	1391.5*	461.55*	801.63*

Table 32

Corporate Relocation Decision Making Is there Method in the Madness?
Author(s): Rothe, Peggie; and Sarasoja, Anna-Liisa.
Date: 2012.
Journal: presented at the American Real Estate Society 28th Annual Meeting.
Theory: This paper attempts to understand the purposes of the formal analysis that is conducted during the relocation decision-making process, whether by the firm itself or by third-party consultants. Langley (1989) sets a framework that suggests there are four purposes for formal analysis, as follows. • Information. Formal analysis is carried out to get information that will help with the better understanding of a certain topic. The number of independent sources of information is maximised here. • Communication. Formal analysis here is done to communicate one's own opinions and convictions. The initiator of the analysis would like to minimise the number of sources of information to the ones that serve their specific purpose. • Direction and control. Formal analysis is done with the intention to get a specific problem solved or a decision implemented. It is done to focus attention on certain issues and make sure decisions are taken accordingly. • Symbolic purposes. Formal analysis is done to 'symbolise information use, rational decision-making, willingness to act, and participation and concern with other people's views'.
Empirical work: • Data: 5 case studies with knowledge intensive organisations that relocated within the same urban area. • Time period: 2010. • Analytical method: analysis based on the case studies. The case studies with individuals in the relocation process were centred around the following themes: (a) the relocation process and the phases related to it; (b) the

organisation involved in the process; (c) the employee and the process; and (d) the interviewees' thoughts concerning outcomes.

Findings from the case studies are as follows.

Type of analysis	Description	Information	Communication	Direction and control	Symbolic
Assessment of markets	Preliminary assessment of office markets (supply, price) (A)	x			
Defining organizational needs	Assessment of organizational requirements in terms of e.g. location, amount of space, layout	x	x		
Defining search criteria	Defining more accurate search criteria	x	x		
Long listing options	Listing possible options and information related to the options	x			
Preliminary comparison of options	Comparison of options, creating shortlist	x	x		
Cost calculations	Cost calculations and comparison to other options		x		x
Site visits	Site visits (A)	x	x		x
Assessment of where employees live	Assessment of where employees live and commuting distances	x	x		
Analysing ways of working	Analysing ways of working (D)	x	x	x	
Employee participation	Assessing employee needs and preferences, concerns, opportunities and opinions through questionnaires, workshops and different voting schemes	x	x	x	x

Table 33

Offshoring Strategy: Motives, Functions, Locations, and Governance Modes of Small, Medium Sized and Large Firms.
Author(s): Roza, Marja; Van den Bosch, Frans A.J.; Volberda, Henk W.
Date: 2011.
Journal: International Business Review.
Theory: The paper discusses the relationship between firm size and cost, resource, and entrepreneurial drivers when making decisions regarding offshoring. Offshoring is the 'relocation of business functions from home base to foreign locations'. The hypotheses with regard to the relationship between firms size and offshoring are as follows. • Offshoring drivers. **H1.** Offshoring driven by cost motives will become more likely when firm size increases. **H2.** Offshoring driven by resources motives (e.g. availability of qualified workers) is equally important for SMEs and large firms. **H3.** Offshoring driven by entrepreneurial motives (willingness to grow and stretch boundaries of the firm) will become less likely when firm size increases. • Offshoring function. **H4.** Offshoring competence creating activities (technologically advanced activities like basic research) will become less likely when firm size increases. • Offshoring location. **H5.** Offshoring to farshore location will become more likely when firm size increases. • Offshoring governance. **H6.** Captive offshoring (full and shared ownership of firm) will become more likely when firm size increases.

Offshoring Strategy: Motives, Functions, Locations, and Governance Modes of Small, Medium Sized and Large Firms.

Empirical work:

- Data: 353 offshored function by firms in the USA, UK, the Netherlands, Germany and Spain.
- Time period: 2006.
- Analytical method: ANOVA tests to study whether significant differences regarding drivers of offshoring exist between small, medium-sized, and large companies.

The above-mentioned hypotheses were tested in the data, with the following specificities.

- Offshoring functions were divided into 1) Finance/Accounting, Human Resources, Marketing & Sales, IT, Call Centre, Procurement, Logistic Services; and 2) Engineering, R&D and Product Design.
- Offshoring could be nearshoring as is the case of European countries offshoring to other Western or Eastern European countries, or US firms offshoring to Canada and Mexico. Whereas other locations for the perspective countries are labelled as farshoring.

Firms were asked to report the importance of each driver on a 5-point scale measure. The mean ratings are presented in the following table.

	Small (1 49 employees)	Medium (50 249 employees)	Large (>250 employees)	F value
Cost driver	4.22	3.71	4.21	5.270**
Resource driver	3.20	3.70	3.71	6.535**
Entrepreneurial driver	2.57	3.65	2.90	10.132***
Function	0.34	0.21	0.16	3.887*
Location	0.90	0.65	0.90	9.838***
Governance mode	0.41	0.35	0.42	0.317

* p< 0.05. ** p <0.01. *** p <0.001., Sample size=353.

Offshoring Strategy: Motives, Functions, Locations, and Governance Modes of Small, Medium Sized and Large Firms.

- Hypothesis 1 can be accepted for medium-sized firms, while small firms indicate ‘cost drivers to be equally important as to large firms’.
- Hypothesis 2 can only be accepted for medium-sized and large firms.
- Hypothesis 3 can only be accepted for medium-sized and large firms.
- Hypothesis 4 is accepted for small and large firms.
- Hypothesis 5 is accepted for medium-sized and large firms.
- Hypothesis 6 is not confirmed.

Table 34

The Effects of Energy Costs on Firm Re location Decisions.
Author(s): Lavric, Lucia; Panhans, Matthew; Hanley, Nick.
Date: 2014.
Journal: University of St. Andrews – Discussion papers in Environmental Economics.
Theory: The discussion in the paper is based on the Pollution Haven Hypothesis (PHH)- which is concerned with the response of firms of tightening pollution regulation.
Empirical work: • Data: manufacturing firms in the EU- specifically relocation activity (634 events of relocation) from within the EU to another country (either within or outside the EU). • Time period: between 2002 - 2013. • Analytical method: discrete choice models (multinomial logit) estimating the choice of relocation from among a set of countries. The model is based on maximising the firm's profit function. The first model estimates a firm's decision to relocate given that it has already decided to relocate to another country in a specific year. The results of the empirical analysis are as follows. • Negative coefficient on the variable 'distance' which implies that the farther away a location is from a firm's current location, the higher the costs of moving. • Positive coefficients on the destination country being a member of the EU and having a common language with the firm's home country. • Negative coefficient on end-user energy prices show that an increased price of electricity discourage firms from relocating form a particular country. Additionally, price elasticities are calculated and the results are such that demand for relocating to any specific country is inelastic with respect to electricity prices. The estimated elasticity of a firm as a response to lower production costs (energy costs) in a foreign country is equal to around 0.7. The estimated elasticity of a firm as a response to an increase in domestic energy costs is around 0.005. Demand

The Effects of Energy Costs on Firm Re location Decisions.

elasticities with respect to electricity prices for selected countries are presented in the table below.

	η_{price}
Austria	0.9272
Brazil	0.7297
Canada	0.4593
China	0.5315
Croatia	0.5933
Czech Republic	0.6942
Denmark	0.7188
France	0.5554
Germany	0.7107
India	0.7969
Japan	1.0024
Poland	0.5508
Russia	0.2873
United Kingdom	0.7367
United States	0.4207

The second model first estimates the firm's decision on whether to relocate or not and second the choice of a country of destination. The model is a nested logit model and the results are as follows.

- Domestic firms are not responsive to increases in domestic energy prices- whereas foreign firms are more responsive and are attracted to a firm with lower energy prices, however the response is modest.
- Better road infrastructure makes a country more attractive as a relocation destination.
- Higher employee compensation makes countries less attractive for relocation.
- Surprisingly, the coefficient on port and rail infrastructure is negative, which might be due to endogeneity bias.

An additional elasticity estimate has been calculated for energy-intensive firms where it was found that they are almost as twice as elastic to energy prices (0.8) as low energy-intensive firms (0.4).

Table 35

Corporate Headquarters Relocation: Evidence from the Capital Markets.
Author(s): Alli, Kasim L.; Ramirez, Gabriel G.; Yung, Kenneth.
Date: 1991.
Journal: AREUEA journal.
Theory: The paper does not discuss a theoretical model before presenting the empirics.
Empirical work: • Data: 87 firms that have relocated their headquarters (both within regions and between regions), two thirds are listed in the NYSE/AMEX exchange and the rest are NASDAQ firms. • Time period: between 1980 - 1988. • Analytical method: logit model to predict the factors that are likely to influence the relocation decision and the choice of the destination area. The differences between relocating and non-relocating firms is studied, where the control group consists of all non-relocating firms in the same industry. The results are as follows. • Relocating firms have larger assets as compared to non-relocating firms and they pay fewer taxes per unit sales. • In general, larger firms are found to be more likely to relocate, which is explained by the fact that as firms grow they become less dependent on local markets. • Additionally, firms paying larger rent expenses per dollar sales are more likely to relocate. • Profit measures do not show a statistically significant relationship with the probability of relocation. A second logit model addresses the factors that affect the decision to a 'FORTUNE-ranked' city in particular. The results are as follows.

Corporate Headquarters Relocation: Evidence from the Capital Markets.

- Size; number of employees / total assets; and whether a company is listed show a statistically significant relationship with the probability of relocating to a FORTUNE-ranked city.
- Coefficients on rent expenses; net profit margin; operating profit margin; return on equity; taxable income; and industry concentration are statistically insignificant.

Table 36

The Role of the Neighbourhood for Firm Relocation.
Author(s): Sleutjes, Bart; Volker, Beate.
Date: 2012.
Journal: Tijdschrift voor economische en sociale geografie.
Theory: The paper does not discuss a theoretical model before presenting the empirics.
Empirical work: • Data: telephone surveys with 258 entrepreneurs located in the Netherlands. • Time period: 2010. • Analytical method: Poisson regression model predicting the mobility of a firm. The model was chosen because it accounts for skewed distributions, where only 14% of the sample firms relocated or planning to relocate. The characteristics of location that are important for entrepreneurs have been grouped into three factors, economic, private, and neighbourhood factors. The economic factor measure business costs on-site, size of business and quality of storage space, accessibility, and proximity to customers, employees, and suppliers. The private factor measures the importance of work-life balance. The neighbourhood factor measures neighbourhood characteristics such as the safe and clean environment, and demographics in terms of age, income and ethnicity. Additionally, a set of control variables including age, size, and sector of firms is included. The empirical results for the determinants of a firm for being potentially mobile are as follows. • Older firms are less likely to relocate compared to younger firms, the factor though is not statistically significant. • Ambitions to hire more employees show a positive statistically significant relationship with the probability to relocate. • Space-related factors are dominant in the relocation decision.

The Role of the Neighbourhood for Firm Relocation.

- The neighbourhood factor is statistically insignificant in the relocation decision. However, in the telephone surveys they are usually mentioned as important reasons to stay in current location.

Firms stated that factors such as dependence on the local market and high costs of relocation stop firms from taking the decision to relocate. Factors that make firms stay in their current location include good accessibility and low rents and mortgages.

The paper also summaries the important location aspects as considered by entrepreneurs. The following chart presents the percentage of entrepreneurs considering each of the factors as important or very important on a 1-5 scale measure, and the sample size is 258.

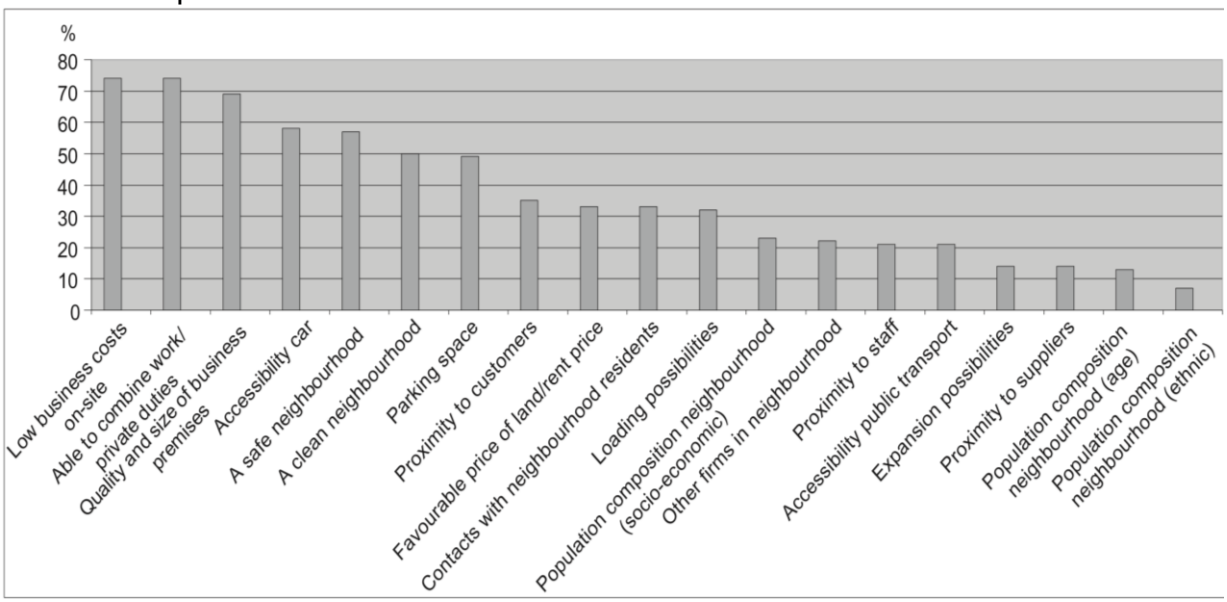


Table 37

Industrial Movement and Regional Development in the United Kingdom.
Author(s): Keeble, D.E.
Date: 1972.
Journal: Town Planning Review.
Theory: The paper aims to understand why post-war manufacturing firms have relocated to particular peripheral areas in the UK. Industrial movement as defined in the paper as 'occurring when an existing manufacturing company establishes a new factory on a site geographically separate from that at which it was or is carrying out production'.
Empirical work: • Data: manufacturing firms relocating from the South East and West Midlands to peripheral areas in the UK. • Time period: between 1945 – 1965. • Analytical method: gravity models estimating industrial movement between origin and destination area. Gravity models are used to test the spatial variation (industrial movement) through the interaction of factors influencing the attractiveness of peripheral areas and the friction of distance involved. In this paper movements in the gravity model are based on the assumption that differences in manufacturing movements are explained by two factors, distance and labour availability. By distance, the author calculates the distance between centres of economic regions (London and Birmingham) to peripheral regions in the UK. Some of the peripheral areas included in the analysis are: Norther Ireland; Rural Wales; East Central Scotland; Northumbria; and Devon & Cornwall. The two factors, distance and labour availability are indeed strong determinants of industrial locations. The significance of distance and labour availability are further studied in regression models where the models show a high value for R-squared and statistically significant coefficients. For example, labour availability explained approximately 86% of observed movement variation from the South East, and 63% for movement from the West Midlands.

Industrial Movement and Regional Development in the United Kingdom.

Accordingly, and given that distance is an important factor for relocation, governments should consider a ‘distance differential in the level of inducements to movement’, in order to compensate firms that would have to relocate to more distant regions.

Table 38

A Global Guide to Business Relocation.
Author(s): Grant Thornton.
Date: 2015.
Journal: Grant Thornton.
Theory: The report does not discuss any theoretical models.
Empirical work: • Data: multiple countries. • Time period: • Analytical method: The report presents a conceptual framework on the types of firm relocation; the drivers; and the activities that are relocated. Followed by 'company profile' summaries of multiple countries across the world. The type / options of relocation are as follows. • Full migration. This type of relocation is highlighted by the headquarters or holding company or both. • Use of Intellectual Property (IP) holding companies and regional hubs. International groups are increasingly making use of IP holding regimes. Given the need for IP protection, these groups consider the 'best place' to maximise protection and manage their taxes in the most efficient way. • Offshoring. Could be identified by the relocation of a support function such as R&D oversees. • Changing the risk model. In order to reduce the risks borne by firms, they might choose to operate through a 'commissionaire, franchising or license model', as an alternative to physical relocation. Drivers of firm relocation are as follows.

A Global Guide to Business Relocation.

- Globalisation. Companies are seeking access to capital and employees in different countries of the world.
- Slow economic recovery. Due to the slow economic recovery, there is pressure on firms to reduce their costs, and they may find it beneficial to relocate to other countries where taxes are lower, as an example.
- Increased compliance burden. For example, the G20 countries have introduced stringent systems to discourage loss of tax revenue across the borders- which has acted as disincentive for firms.
- Competitive advantage. It is important for companies to keep a competitive advantage.
- Tax incentives. Governments are adjusting their tax systems to attract firms.
- Other factors. Other factors include local business environment; government incentives; personal and corporate liability; culture; governance; language; political reasons; social stability; and ease of inward investments.

The types of activities that are relocated are as follows.

- Support functions. Involves the relocation of routine activates such as the cash facilities of treasury companies. Considerations of the commercial factors and tax treatments in the destination country are important here.
- Business functions. Involves the relocation of volume-adding functions such as R&D facilities. The factors considered here are the location of suppliers, customers, and a skilled labour force.
- Value-add functions. Involves the relocation of the holding company and the associated active management.

The factors that determine the optimal location for the components of the supply chain are as follows.

- Central entrepreneur. Given that it is the ‘hub of the structure’ it will benefit from access to good labour force and flexible taxing regimes.
- Holding company. The location is determined by shareholder considerations and company law.

A Global Guide to Business Relocation.

- Technology centre. Factors influencing location include access to appropriate staff and potential investment incentives form governments.
- Shared services. These are often relocated oversees such as call centres.
- Distribution activities. These are the operations that are physically difficult to move and so can be structured as a commissionaire or limited risk distributor.
- Toll or contract manufacturing. These are located in areas with ‘low cost base’.

Table 39

Why and Where Do Headquarters Move?
Author(s): Strauss-Kahn, Vanessa; Vives, Xavier.
Date: 2006.
Journal: Regional Science and Urban Economics.
Theory: The theoretical model assumes that a firm is composed of a headquarter and a plant. The firm locates its headquarters in region t and its plant in region j. Firms choose prices for their products such that their profits are maximised. The firm's cost function takes into account the costs of transferring services from headquarters to the plant. A firm with a plant in region j will decide whether to locate its headquarters in region t or in region r by comparing its profits under the two different situations.
Empirical work: • Data: 1,441 US. Headquarters that have relocated, 25,900 US headquarters to study the decision of whether to relocate. • Time period: between 1996 - 2001. • Analytical method: nested logit model estimating the decision regarding the location of headquarters. The structure of the nested logit model is such that a firm first decides whether it wants to move or not, and then conditional on that decision, it will choose the metropolitan area it wants to move to (where one way to compare metropolitan areas is it classify them by size and geographic region). The explanatory variables included in the regression analysis on where does a firm choose to relocate include variables on the characteristics of the locations that host more than 0.1% of the total number of headquarters. In studying the decision of whether to relocate or not, firm-specific variables are added to the variables reflecting characteristics of the destination regions. The 'where to locate' model is estimated in two steps, first with regard to the choice of the metropolitan area within a region, and then the choice of the region taking into consideration the attractiveness of the metropolitan areas that belong to the region. The empirical results of the model are as follows.

Why and Where Do Headquarters Move?

- Estimations of wage elasticity suggest that a 10% increase in wages in a metropolitan area, decreased the probability of moving to that metropolitan area by 25%.
- The statistical significance of corporate taxes in choosing a particular metropolitan area depends on the model specification.
- A 10% increase in the distance between the headquarter and the plant, decreases the probability that the metropolitan area will be chosen by 2.2%.
- Availability of airports seem to have an important influence on the choice of location for headquarters. If the city offers a 'small hub' then the probability of locating in the metropolitan area increases by 40%, whereas if it offers a 'large hub', the probability increases by 90%.
- The coefficient on the total number of headquarters in a metropolitan area and the count of headquarters of the same industry is positive and statistically significant- in all specifications of the model.
- The coefficient on the relative availability of financial and business services is positive and statistically significant in all model specification.

The empirical results for the 'whether to relocate' model are as follows.

- The larger the sales of a headquarter, the more likely it is to relocate.
- Younger headquarters are more likely to relocate than older headquarters.
- Headquarters that belong to firms that have been part of a merger or have been acquired by other firms have a higher probability of relocating.
- Foreign firms in the US are more likely to relocate than their indigenous counterparts.
- Higher wages in a metropolitan area have a positive influence on the decision to relocate.
- A one-point growth in corporate tax increases the probability of relocation by around 2.8%.
- The larger the airport hub in the metropolitan area where the headquarter is located, the less likely that a firm will consider relocating.

Why and Where Do Headquarters Move?

- Firms are less likely to relocate their headquarters if they are already located in a metropolitan area where there is a large number of headquarters belonging to the same industry.
- In the case of manufacturing firms in specific, headquarters are less likely to move from a metropolitan area with high specialisation in their sector of activity.
- Surprisingly, the coefficients on the availability of business and financial services are positive. One would expect a negative coefficient since they have an influence on a firm's profit through cost efficiency gains.

Table 40

The Internationalisation of UK R&D.
Author(s): Bloom, Nicholas; Griffith, Rachel.
Date: 2001.
Journal: Fiscal Studies.
Theory: The paper does not discuss a theoretical model before presenting the empirics.
Empirical work: • Data: Australia; Canada; France; Italy; Germany; Japan; UK; and USA. • Time period: between 1979 - 1997. • Analytical method: IV model of the form below $r_{it}^{d} = \beta_0 y_{it} + \beta_1 \rho_{it}^{d} + \beta_2 \rho_{it}^{f} + f_i + t_t + e_{it}$ Where r is domestic R&D, y is domestic real output, ρ is domestic user cost of R&D, f are country-specific fixed effects, and t is a full set of time dummies. Before estimating the empirical model, the paper discusses some trend of UK R&D and innovation in comparison with other G5 countries (USA, Japan, Germany, and France). It concludes that the decline in the proportion of UK's GDP that goes into R&D is due to the decline in government spending. Additionally, R&D in the UK has been increasingly carried out by foreign firms, and the highest R&D growth industry in the UK (pharmaceuticals) have been increasingly doing their R&D abroad. The literature has related this internationalisation of R&D to two factors, incentives to R&D introduced by countries, and the increasing importance of agglomeration economies. The empirical model in the paper takes into consideration the fact the R&D is largely persistent by taking a time trend variable, and drops the USA from the sample because it is assumed to be a 'closed' economy that will not be affected by incentives in foreign countries. After controlling for country and year dummies, the results of the model then show that there is a positive relationship between the amount of R&D conducted in one country and the tax price of conducting R&D in its major Foreign Direct Investment partners.

The Internationalisation of UK R&D.

The domestic user cost of R&D is negative and statistically significant with an impact elasticity of around 0.14, and a long run elasticity of 1.18.

The paper concludes that part of the ‘internalisation’ and movement of R&D is the increasing ‘generosity of tax incentives’ in other countries.

Table 41

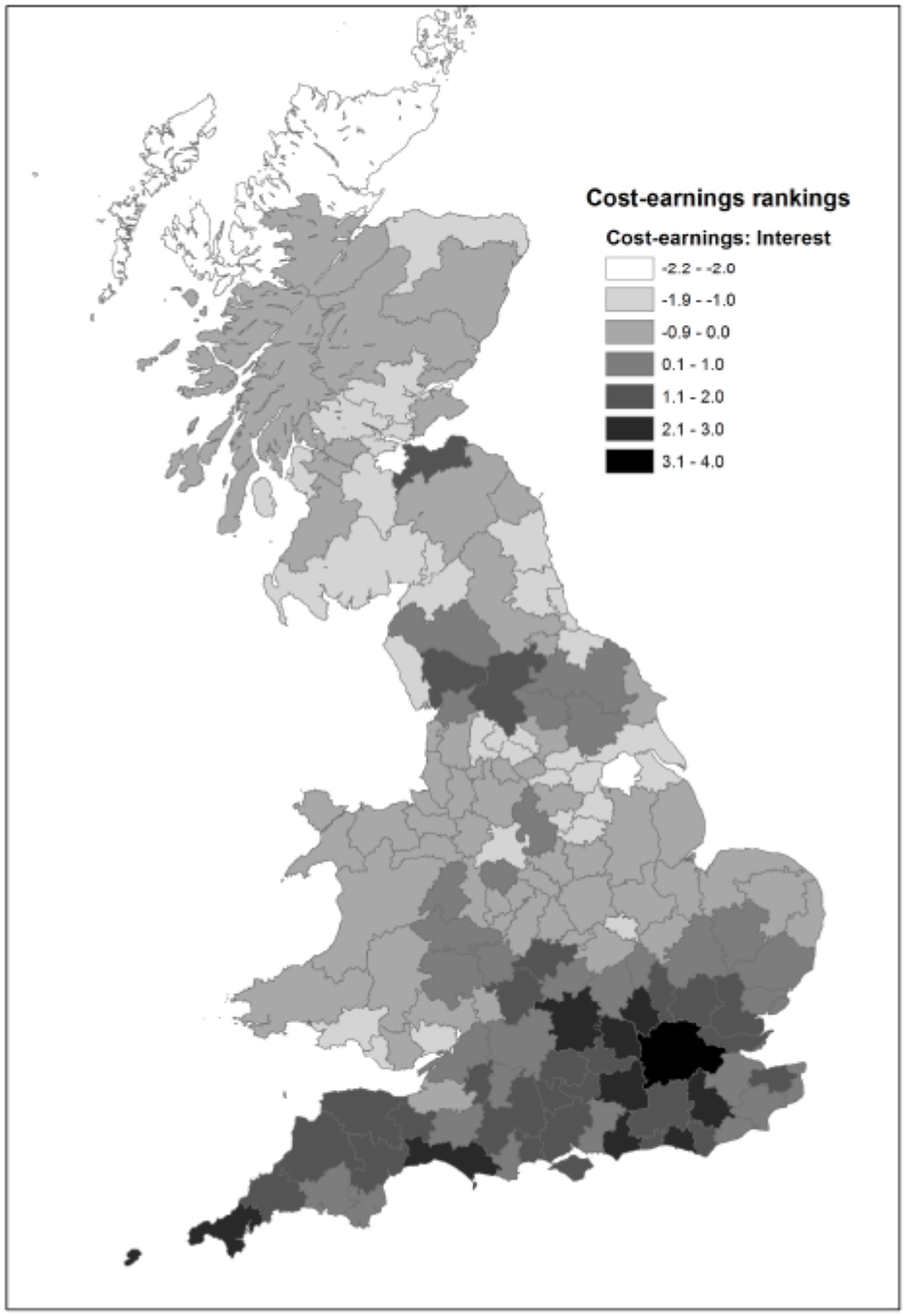
Location Choice between Rationality and Emotionality: The Concept of 'Emerging Place Decisions'
Author(s): Scherer, Roland; Derungs, Curdin.
Date: 2008.
Journal: University of St. Gallen.
Theory: The authors discuss the decision-making process of firms with regard to relocation with an 'Emerging Strategy Process' framework, rather than a 'linear-sequential' framework. The model distinguishes between 'Intended' and 'Realised' strategies, form which three types of strategies can be further derived, 'deliberate strategy'; 'unrealised strategy'; and 'emergent strategy'. The first strategy is usually implemented after careful consideration, while the latter two strategies are applied without any previous planning. In concrete terms, the strategy discussed by the authors is one that allows firms to adapt to changing internal and external requirements and conditions. The factors that are thought to influence the sequence of the decision-making process are as follows. • Due to factors such as personal preferences of management, areas that a company considers for relocation will be limited or previously specified. • Key individuals and owners will form subjective judgements on the quality of location, and locations which they deem of low quality will not be considered. • Key individuals and owners might also take important decisions based on personal talks with their networks and colleagues. • In the case of large firms, the decision is made in groups, and people who have more influential power and at a stronger position could move the direction of the decision to align with their personal motives and preferences. Accordingly, emotions and personal preferences are part of the decision-making process. In fact, they are perceived as a device that allows decisions to be made in the case of imperfect information.
Empirical work: This paper does not include any empirical analysis.

Table 42

Real Earnings Disparities in Britain
Author(s): Gibbons, Stephen; Overman, Henry G.; Resende, Guilherme.
Date: 2011.
Journal: SERC Discussion Paper.
Theory: The underlying theory used in this paper is that amenity value or quality of life in a location can be measured using the difference between housing costs in that location and expected earnings in jobs that are accessible from that location. It assumes that a large enough group of people are sufficiently geographically mobile to ensure that, in the long run, spatial disparities in their economic welfare are eliminated. If such spatial equilibrium holds, it means that cost-earnings differentials compensate for area level amenities and dis-amenities. That is, all else equal, a lower level of local amenities would have to be compensated by a higher differential between housing costs and earnings. There are a number of theoretical considerations that the authors identify that could cast doubt on the general validity of the equilibrium model. These include assumptions made around: the substitution of housing services resulting from price changes; identical preferences over amenities; constraints on the supply of housing in different locations; and the degree to which people are mobile. Despite these potential limitations, the authors are confident that their analysis is informative about the willingness to pay for amenities (or quality of life) offered by different labour markets.
Empirical work: • Data: Great Britain. • Time period: 1998-2007. • Analytical method: various regression approaches. Based on the theory set out above, the authors first calculate the cost-earnings differentials for labour market areas – which are aggregations of travel to work areas. This provides an estimate of the willingness to pay for amenities / quality of life provided by the different labour market areas. These results are illustrated below.

Real Earnings Disparities in Britain

Figure 4: Housing cost minus earnings differentials for GB Labour Market Areas. Work-place based wages, interest only plus maintenance, council tax, stamp duty, 1.7 worker households



This suggests that there is a prevalence of high quality of life labour market areas in the south of Great Britain (darker shaded areas).

Real Earnings Disparities in Britain

Subsequently, the authors regress these willingness to pay for amenities / quality of life estimates on a range of explanatory variables. They find that the following factors have a positive effect on quality of life:

- Availability of employment.
- Woodland cover.
- Ruggedness of terrain.
- Presence of museums.

Factors that were found to have a negative effect on quality of life were:

- Rainfall.
- Particular matter (air pollution).
- Crime.

In addition, the north/south and east/west location of an area was found to be a significant driver of quality of life. This could, for example, reflect omitted climate or other environmental variables, be related to proximity to London, or be proxying some other unobserved amenity that is more prevalent in the South East.

Apart from location north/south, the factors which were found to affect quality of life the most (the £ value of a 1 standard deviation in the measure) were employment accessibility (~£500) and particular matter (~£900).

The authors also note that there are collinearity issues, and that the regressions are intended to be descriptive, and they are not always confident about placing a 'causal' interpretation on them.

Table 43

Competitive Alternatives, KPMG s guide to international business locations costs
Author(s): KPMG.
Date: 2016.
Journal: KPMG.
Theory: The paper does not discuss a theoretical model before presenting the empirics.
Empirical work: • Data: Global. • Time period: 2015. • Analytical method: descriptive and comparative statistics. This publication measures international business costs based on the combined impact of 26 key cost items that vary by location. Current business costs, together with planned future tax changes, are modelled over a 10-year planning horizon, starting in 2016. This study compares seven distinct business service sector operations and 12 manufacturing sector operations. Overall cost comparisons for each country and city are based on the average results for these two sectors. Labour costs represent the single largest cost category, and represent between 40 and 86 percent of total location-sensitive costs for the industries examined. Transportation (freight) costs vary by industry, product and markets served, and can represent up to one quarter of location-sensitive costs for the specific manufacturing operations studied. Total tax costs typically represent up to 18 percent of location-sensitive costs for the operations and locations examined. Corporate income taxes and property taxes, both calculated net of generally applicable tax incentives, represent the major forms of taxation that are widely applied in all study countries. All 26 location-sensitive cost factors are shown below.

Competitive Alternatives, KPMG s guide to international business locations costs

Labor costs

Wages and salaries:

1. Pay rates for 42 job positions

Statutory plans:

2. Government pension plans
3. Public medical plans
4. Unemployment insurance
5. Workers' compensation

Other employee benefits:

6. Paid time off (holidays & vacation)
7. Private health insurance
8. Other discretionary benefits

Facility costs

9. Office leasing
10. Factory leasing
11. Industrial land
12. Industrial construction

Transportation costs

13. Surface freight (road & sea)
14. Air freight

Utility costs

15. Electricity
16. Natural gas

Cost of capital

17. Financing costs (interest)
18. Depreciation charges

Taxes other than income

19. Property taxes
20. Capital taxes
21. Sundry local business taxes
22. Transaction and sales taxes

Income taxes

23. National
24. Regional (state, provincial, etc.)
25. Local

Incentives

26. Tax and other incentives

The authors note that the results of the study are sensitive to exchange rates, and that significant shifts in the value of the US dollar had a material effect on the results compared to the previous year's study.

Overall, of the countries included in the study, the three with the lowest business costs were found to be Mexico, Canada and Netherlands. The UK was seventh lowest cost.

National results for the UK reflect the combined results of London and Manchester. Manchester was found to be the lowest cost major European city among the 10 that were compared, whilst London was the most costly.

Of the 10 countries included within the 2016 and 2014 study, the UK ranked:

Competitive Alternatives, KPMG s guide to international business locations costs

- 5th in manufacturing.
- 6th in both corporate services and digital services.
- 9th in R&D services.

The report also identified the following major cost factors for the UK between 2014 and 2016:

- 6.1% currency depreciation against the US$.
- Strong appreciation of UK pound relative to other currencies.
- Increase in office leasing costs, mainly for suburban offices.
- Large decrease in air freight costs.
- Phased-in corporate income tax rate reduction.

In addition to the analysis of location costs, the report also provides insight into how firms select sites. The factors set out below are identified.

	Cost factors	Other key factors
Business	**Business costs** • Facilities: industrial, office • Labor: wages, salaries, benefits • Transportation & distribution • Utilities • Financing • Federal, regional, local taxes	**Business environment** • Labor availability and skills • Access to markets, customers, suppliers • Road, rail, port, airport infrastructure • Utility, telecom, internet services & reliability • Suitable sites and facilities • Regulatory environment
Personal	**Cost of living** • Personal taxes • Cost of housing • Cost of consumer products & services • Healthcare costs • Education costs	**Quality of life** • Healthcare facilities • Schools & universities • Crime rates • Climate • Culture and recreation

Subsequently, based on *Area Development Magazine's* annual US corporate survey, the report details the relative importance of different factors in the site location choice. As can be seen below, availability of skilled labour, access to highways, and quality of life are identified as the three most important factors.

Competitive Alternatives, KPMG s guide to international business locations costs

	% citing as important			
	2015		2013	
Availability of skilled labor	92.9	(1)	95.1	(1)
Highway accessibility	88.0	(2)	93.5	(2)
Quality of life	87.6	(3)	n/a	
Occupancy or construction costs	85.4	(4)	87.4	(4)
Available buildings	83.7	(5)	83.3	(6)
Labor costs	80.8	(6)	90.8	(3)
Corporate tax rate	78.8	(7)	82.4	(7)
Proximity to major markets	76.3	(8)	75.6	(15)
State and local incentives	75.8	(9)	81.9	(8)
Energy availability and costs	75.3	(10)	80.8	(10)
Tax exemptions	74.7	(11)	80.6	(11)
Expedited or "fast-track" permitting	74.2	(12)	76.3	(14)
Available land	73.9	(13)	80.3	(13)
Environmental regulations	69.8	(14)	71.7	(17)
Training programs/technical colleges	68.7	(15)	54.0	(22)
Right-to-work state	67.7	(16T)	80.6	(11)
Availability of long-term financing	67.7	(16T)	74.8	(16)
Low union profile	66.3	(18)	81.4	(9)
Inbound/outbound shipping costs	64.6	(19)	70.9	(18)
Proximity to suppliers	64.3	(20)	67.7	(19)

Table 44

Place marketing in shrinking Europe: some geographical notes
Author(s): Hospers, Gert-Jan.
Date: 2011.
Journal: Tijdschrift voor economische en sociale geografie.
Theory: This paper identifies two broad approaches to the study of place marketing: (i) the promotion perspective, which treats places largely as consumer products and focuses on the process of place promotion; and (ii) a more encompassing spatial perspective, which deals with the marketing implications of the place product – that is, unlike well-defined consumer products, 'places' can have fuzzy boundaries and are multidimensional. Given the empirical observations discussed below, the author suggests that less attention should be given to 'cold' place markets, which tries to encourage individuals and firms to an area. Rather, more attention should be given to 'warm' place marketing, which tries to encourage existing residents to stay, or others with existing attachments to an area to move there.
Empirical work: • Data: Europe. • Time period: Up to 2011. • Analytical method: empirical observations and existing literature. This paper supports its main conclusion through empirical observations, including the following. • A lot of attention is paid to the visual representation of the place by means of pictures, logos and slogans. The usual result of this 'place commodification' is a campaign in the media with the associated brochures, displays and websites. Examples are 'Yorkshire: Alive with Opportunity', 'Saxony: State of the Arts' and 'There is Nothing Beyond Groningen'. • Sometimes, place marketing measures are more original. The Swedish town of Lekeberg, for example, raffled building lots among in-migrants and new firms. The Austrian village of Rappottenstein offered free lots for outsiders that wanted to start

Place marketing in shrinking Europe: some geographical notes

a family there. Singles were accepted as well, provided that they looked for a partner with a desire to have children.

- Lankhuizen (2009), which studies 91 US and Asian life sciences companies, showed that over one third of these multinationals' location decisions can be explained by personal ties of executives and directors with certain places.
- Dutch entrepreneurs are extremely homeloving: over the period 1999–2006, 75% of the migrating firms stayed in the same municipality, while only 6% of them left for a surrounding region (Van Oort et al., 2007).
- Previous evaluation studies on place marketing campaigns in Europe do not find a general positive effect of such communication strategies on the in-migration of inhabitants and companies (Young & Lever, 1997; Niedomysl, 2007; Pellenbarg & Meester, 2009).
- Firms have a lot of 'location-specific capital' (e.g. trained personnel and close ties with local suppliers and clients), which make them stay (DaVanzo 1981). Even if place marketing succeeds in telling entrepreneurs convincingly that they have to pay less in a particular area, the chance that they will respond to this by moving is low.

The author draws the conclusion that "Generally, firm migration over short distances is the rule, while long-distance migration is the exception."

Appendix B

This appendix includes further details in relation to our analysis of the IDBR.

Definitions of local units, enterprises and enterprise groups

The IDBR captures the structure of ownership and control of firms and plants and business sites that make up the UK economy using three aggregation categories; the enterprise, enterprise group, local unit which are defined precisely in the EU Regulation on Statistical Units (EEC 696/93) as follows.

- **Local Unit**. The local unit is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. At or from this place economic activity is carried out for which – save for certain exceptions – one or more persons work (even if only part-time) for one and the same enterprise.
- **Enterprise**. The enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit.
- **Enterprise Group**. An enterprise group is an association of enterprises bound together by legal and/or financial links. A group of enterprises can have more than one decision-making centre, especially for policy on production, sales and profits. It may centralise certain aspects of financial management and taxation. It constitutes an economic entity which is empowered to make choices, particularly concerning the units which it comprises.

Cross-check with ONS published statistics

As an initial cross-check, we compared the data we are using from the IDBR (which includes only ‘canonical’ enterprises) with statistics published by the ONS in relation to the population of enterprises (which itself is based on the IDBR). The two tables below compare sources of data for the number of employees per enterprise and the number of local units per enterprise. As can be seen, for the enterprises of most interest to us (with 50+ employees) the two sources align closely.

Table 45: Comparison of ONS published statistics and our dataset, number of employees, 2017

Number of employees	ONS	Our dataset	% variance
0 to 9	2,386,740	2,388,448	0.1%
10 to 19	151,140	145,131	-4.0%
20 to 49	80,575	78,485	-2.6%
50 to 99	25,915	25,639	-1.1%
100 to 249	14,615	14,543	-0.5%
250 to 999	7,195	7,180	-0.2%
1,000 or more	2,630	2,629	0.0%
Total	2,668,810	2,662,056	-0.3%

Table 46: Comparison of ONS published statistics and our dataset, number of enterprises, 2017

1	2,610,015	2,603,261	-0.3%
2 to 4	47,775	46,774	-2.1%
5 to 9	6,695	6,693	0.0%
10 to 19	2,595	2,596	0.0%
20 or more	2,730	2,732	0.1%
Total	2,668,810	2,662,056	-0.3%

Summary of variables included in the econometric analysis

The table below specifies the main variables used in our econometric analysis. In reference to our conceptual framework, variables are grouped by colour coding into: firm characteristics; 'market' location characteristics; and 'non-market' location characteristics.

Table 47: Variables used in econometric analysis

Variable	Source	Notes
Industry	IDBR	• The Standard Industrial Classification (SIC) code of the industry group as of the 2007 classification. • The SIC code is available for each local unit across the time period covered in the analysis (2007-2017). • The variable is included as a **dummy variable** reflecting the industry that the local unit belongs to. The variable does not vary over time for the unique

Variable	Source	Notes
		local unit. The industry groups that have been included in the analysis are: – Manufacturing; – Information and Communication; – Financial and Insurance Activities; – Professional, Scientific, and Technical Activities; and – Administrative and Support Service Activities.
Employment	IDBR	• The total number of employees at the local unit. • The employment variable is available for each local unit across the whole of the time period covered in the analysis. • The variable is **continuous**, and it varies across time for the unique local unit.
Turnover	IDBR	• The enterprise's turnover. • The variable is available for each enterprise for the whole of the time period covered in the analysis. • The variable is **continuous**, and it varies across time for the unique local unit. • Given that the variable is available at the enterprise rather than the local unit level, local units that belong to a multi-site enterprise have been assigned the turnover figure of the enterprise that they belong to.
Age	IDBR	• The birth date of each local unit. • The birth year is taken from the birth date of each of the local units and included as a **continuous** variable

Variable	Source	Notes
		in the analysis such that the earlier the birth year, the older is the local unit.
Type	IDBR	• The type of the local unit. The two types of the local units are: Implicit and Explicit units. Implicit units are single-site enterprises. Explicit units are those that belong to multi-site enterprises. • The variable is available for each local unit included in the analysis. • The variable is included as a **dummy variable** in the analysis and it does not vary over time for the unique local unit.
Number of local units	IDBR	• Number of local units belonging to the enterprise within our sample. • The variable is **continuous**, and it varies across time for the local unit.
Ownership	IDBR	• The immediate ownership of the enterprise. The variable varies across the time, and is missing for some observations in the sample. • The variable is included as a **dummy variable** in the analysis to reflect foreign ownership. • Given that the variable is identified at the enterprise rather than the local unit level, explicit local units are assigned the variable of the enterprise to which they belong to.
Change of local unit size	Calculated from IDBR	• A set of defined **dummy variables** for local units included in the sample of local units that are continuously present in each year of the analysis. • The variables are defined over both employment and turnover, as follows.

Variable	Source	Notes
		• Employment. – Expansion. Dummy variable that takes a value 1 if the local unit has increased its employment by twice or more over the past 10 years (2016 in comparison with 2007). – Contraction. Dummy variable that takes a value 1 if the local unit has reduced the number of employees by half or more over the past 10 years (2016 in comparison with 2007). • Turnover. – Expansion. Dummy variable that takes a value 1 if the turnover of the enterprise that the local unit belongs to increased by twice or more over the past 10 years (2016 in comparison with 2007) • Contraction. Dummy variable that takes value 1 if the turnover of the enterprise that the local unit belongs to has decreased by half or more over the past 10 years (2016 in comparison with 2007).
Previous relocation	Calculated from IDBR	• A dummy variable defined for the local units that are continuously present in each year of the analysis. • The variable takes a value 1 for the local units that have relocated between 2016-17 *and* relocated based on a change in the travel to work area between any two consecutive years before 2016.
Presence of research hub	Calculated	• **Dummy variable** that takes a value 1 if the local authority district where the local unit is located has a Russell Group university.
Gross Value Added (GVA) per head by	ONS	• GVA is 'the value generated by any unit engaged in the production of goods and services'[23].

[23] https://www.ons.gov.uk/economy/grossvalueaddedgva

Variable	Source	Notes
local authority district		• **Continuous variable** defined at the local authority district level.
Regional wage level	ONS	• Median gross annual earnings. Available for all UK regions across the entire time period of the analysis. • **Continuous variable**. • The variable varies across time.
Regional consumer price level	ONS	• The relative regional consumer price level. Available for all UK regions. • **Continuous variable**. • The variable is available for 2010 only, and the same regional figures of that year are used for the rest of the years in the analysis.
Regional commercial and industrial property prices	Department for Communities and Local Government (DCLG)	• Rateable value per m ² for commercial and industrial properties. • **Continuous variable**. • Available for England and Wales only. • Available for 2007 and 2008 only for the time period of the analysis. • For the purposes of the analysis, and to have the variable across all years, the regional figures from 2008 are used for the rest of the years included in the analysis.
Travel time to closest railway station	DfT	• Travel time to nearest rail stations during morning peak. The estimates are the minimum travel times by car. • **Continuous variable**.

		• Available at the LSOA level. • Available for 2013 only, and the figures were used for the rest of the years included in the analysis.
Travel time to closest airport	DfT	• Travel time to nearest airport during morning peak. The estimates are the minimum travel times by car. • **Continuous variable**. • Available at the LSOA level. • Available for 2013 only, and the figures were used for the rest of the years included in the analysis.
Travel time to closest road junction	DfT	• Travel time to nearest road junction during morning peak. The estimates are the minimum travel times by car. • **Continuous variable**. • Available at the LSOA level. • Available for 2013 only, and the figures were used for the rest of the years included in the analysis.
Rural / urban classification	ONS	• The 2001 rural / urban classification of output areas in the UK. • The variable is included as a **dummy variable** in the econometric analysis.
Regional dummies	Calculated	• A set of calculated UK regional **dummy variables.**
Time trend	Calculated	• A set of calculated variables included in the panel econometric analysis, as follows.

		• A **dummy variable** that controls for the 'post-crises' time period, and takes a value 1 if the local unit is in 2012, 2013, 2014, 2015, 2016, or 2017. • A **continuous** time trend variable to reflect the year to which the identified relocation of the local unit belongs to.
Index of multiple deprivation (IMD)	DCLG, Scottish Government, Welsh Government and NI Statistics	• Calculated adjusted IMD scores that are comparable across local authority districts in the UK[24]. • The year for which the data is taken for each of UK's countries is as follows. – England (2015). – NI (2010). – Scotland (2012). – Wales (2014). • The variable is **continuous** and does not vary across the time period of the analysis.
Rainfall	Met Office	• Rainfall (mm) for all UK regions. • **Continuous variable**. • The variable varies across time.

Model specifications

We use four econometric estimation techniques to estimate the different model specifications as described in

[24] For more information on how the adjusted IMD scores were calculated for UK countries, see: Abel, G.A., Barclay, M.E., and Payne, R.A., 2016. Adjusted indices of multiple deprivation to enable comparisons within and between constituent countries of the UK including and illustration using mortality rates. *BMJ open, 6(11).*

Figure 31, which are OLS, Random Effects, Logit, and Logit Random Effects. In this section we discuss the characteristics of each of these four estimation techniques.

- **Pooled OLS.** In the of model specification 1 to 3[25], the observations are pooled in the sense that they are all treated as independent observations (rather than repeated observations of the same local units). The model can be characterised as:

$$\Pr(relocate_i) = fn(unit\_characteristics_i, location\_characteristics_i)$$

The characteristics of the pooled OLS model are as follows.

  - The pooled model treats all observations as independent observations (rather than repeated observations of the same local unit as is the case of panel models).
  - Estimating the model with pooled OLS specification can produce unbiased coefficients if the relocation behaviour of an individual local unit in a given time period is independent of its relocation behaviour in other time periods.
  - A limitation of the OLS model in our study is that that predicted probabilities can lie outside the possible range of 0 to 1.

- **Logit models.** Logit models are appropriate when the dependent variable is dichotomous. The unknown parameters in the logit model are estimated by maximum likelihood techniques. The coefficients of the explanatory variables in the following log-likelihood function are estimated by numerical maximisation technique.

$$Ln(L) = \sum_{n=1}^{N} \left(y_i \ln F(X'_i \beta + (1 - y_i) \ln\left(1 - F(X'_i \beta)\right) \right)$$

  Where yi=1 with probability Pi and yi=0 with probability 1-Pi. The function F is the logistic cumulative distribution function. N is the total number of observations in the sample.

  The characteristics of the logit models are as follows.

  - They allow the dependent variables to take values in the range of 0 to 1 only.
  - In comparison with the OLS model that assumes that the marginal effect of the independent variables is linear, logit models allow for different rates of change at the low and high ends of the independent variables.

[25] Model 4 only includes observations from one time period, so pooling does not take place.

  - The coefficients from the logit model are less straight-forward to interpret in comparison with the coefficient of the OLS model which are interpreted as the change in the dependent variable as a response to a one-unit change in the independent variable, while holding other variables constant. The coefficient of the logit model are the odds ratio, however, they can be transformed into probabilities with the following formula:

$$\Pr(relocate) = \frac{\exp(X'_i \beta)}{1 + \exp(X'_i \beta)}$$

We note that the logit models do not converge when we include regional dummies into the model, which is a 'limitation' of these models given that location factors are of particular interest for this study.

- **Random effects**. Random effects models allow for between-subject variability and within subject variability. The characteristics of the random effects models are as follows.
  - They allow for the estimate of the effects of time-invariant variable whereas the fixed effect models control for these variable or 'partial them out'.
  - Random effects models have smaller standard errors in comparison with fixed effects models.
  - Given that the random effects models assume that the omitted variables are uncorrelated with the explanatory variables of the model, the coefficient estimates are likely to be biased because the omitted variables are not controlled for in the model.
- **Random effects logit**. Combines the characteristics of the above two mentioned models.

We note again that the logit random effects models do not converge when we include regional dummies into the model, which is a 'limitation' of these models given that location factors are of particular interest for this study.

Regression outputs

	OLS			
	1	2	3	4
Manufacturing	-0.00245***	-0.00171***	-0.00184***	-0.00170
	(0.000391)	(0.000456)	(0.000507)	(0.00109)
Information and communication	-0.00118**	-0.00108*	-0.00108*	-0.00302**
	(0.000519)	(0.000570)	(0.000620)	(0.00141)
Financial and insurance activities	-0.00213***	-0.00136**	-0.00120*	-0.00274
	(0.000611)	(0.000656)	(0.000715)	(0.00169)
Professional, scientific and technical activities	-0.00138***	-0.000740	-0.000736	-0.00108
	(0.000436)	(0.000510)	(0.000557)	(0.00117)
Number of employees	-8.42e-07**	-9.90e-07***	-1.02e-06**	-1.01e-06
	(3.60e-07)	(3.72e-07)	(4.06e-07)	(8.60e-07)
Turnover	0*	0	0	5.13e-11
	(0)	(0)	(0)	(8.10e-11)
Birth year	0.000150***	9.52e-05***	9.42e-05***	0.000133***
	(1.52e-05)	(1.64e-05)	(1.82e-05)	(3.81e-05)
Single site enterprise	0.0212***	0.0256***	0.0245***	0.0101***
	(0.00119)	(0.00205)	(0.00215)	(0.00274)
Number of local units	-1.29e-06***	-1.06e-06**	-1.40e-06***	-9.95e-07
	(4.68e-07)	(4.61e-07)	(5.05e-07)	(1.49e-06)
Wage level	-3.52e-07	4.62e-07	7.75e-07	8.23e-07
	(4.22e-07)	(5.03e-07)	(6.02e-07)	(5.73e-07)
Consumer price level	0.000167	-0.000501	-0.000610	-0.000339
	(0.000392)	(0.000468)	(0.00672)	(0.000586)
GVA per head	-7.98e-10***	-7.87e-10***	-7.55e-10***	-8.20e-10
	(2.01e-10)	(2.15e-10)	(2.30e-10)	(5.27e-10)
Rural	-0.000478	-0.00136	-0.000746	0.000278
	(0.000960)	(0.00108)	(0.00240)	(0.00268)
Russell Group university	-0.000500	-0.000662	-0.000753	-0.00208*
	(0.000428)	(0.000474)	(0.000536)	(0.00119)
Index of Multiple Deprivation	-0.000169***	-0.000173***	-0.000160***	-8.19e-05
	(2.14e-05)	(2.38e-05)	(2.71e-05)	(5.92e-05)
Rainfall	1.97e-05	1.80e-05	-1.16e-06	0.000259
	(1.51e-05)	(1.63e-05)	(2.10e-05)	(0.000232)
Post crises	0.000865	0.00144*	0.00223**	
	(0.000741)	(0.000788)	(0.000979)	
Time trend	-9.35e-06	-0.000371	-0.000576*	
	(0.000221)	(0.000252)	(0.000299)	
North East	-0.00261**	-0.000944	0.000138	-0.00553
	(0.00118)	(0.00131)	(0.00903)	(0.00419)
North West	-0.00278***	-0.00185*	-0.000698	-0.0135
	(0.000994)	(0.00107)	(0.00522)	(0.0101)
Yorkshire and the Humber	-	-	-	-
	-	-	-	
East Midlands	-0.00228**	-0.000524	-0.00170	0.00169
	(0.00114)	(0.00135)	(0.0168)	(0.00192)
West Midlands	-0.00178	0.000899	-0.000475	
	(0.00142)	(0.00167)	(0.0218)	
East	-0.00103	7.36e-05	-0.00257	0.00248
	(0.00107)	(0.00126)	(0.0137)	(0.00273)
South East	-0.000394	5.14e-05	-0.00302	-0.000171
	(0.000755)	(0.000873)	(0.0111)	(0.00161)
South West	-0.00422***	-0.00287**	-0.00480	-0.00858
	(0.00121)	(0.00134)	(0.00872)	(0.00719)
Wales	-0.00353**	-0.00208	-	-0.0125
	(0.00149)	(0.00163)	-	(0.0115)
Scotland	-0.00461***	-0.00288**	-	-0.0181
	(0.00131)	(0.00140)	-	(0.0142)
Northern Ireland	-0.00114	0.00115	-	-0.00566
	(0.00142)	(0.00162)	-	(0.00610)
Immediate foreign owner		-0.000460	-0.000417	
		(0.000329)	(0.000364)	
Commerical property prices			-8.19e-05	
			(0.000742)	
Travel time to closest railway station			1.05e-05	
			(4.91e-05)	
Travel time to closest airport			-0.000130**	
			(5.31e-05)	
Travel time to closest road junction			7.41e-05***	
			(2.61e-05)	
Constant	-0.298***	-0.141***	-0.119	-0.264***
	(0.0418)	(0.0472)	(0.614)	(0.0890)

	Logit			
	1	2	3	4
Manufacturing	-0.495***	-0.395***	-0.439***	-0.388
	(0.0848)	(0.112)	(0.119)	(0.289)
Information and communication	-0.182*	-0.244*	-0.254*	-0.736*
	(0.103)	(0.135)	(0.139)	(0.391)
Financial and insurance activities	-0.490***	-0.369**	-0.303*	-0.784
	(0.149)	(0.175)	(0.177)	(0.553)
Professional, scientific and technical activities	-0.232***	-0.165	-0.169	-0.195
	(0.0863)	(0.115)	(0.119)	(0.265)
Number of employees	-0.000437***	-0.000698***	-0.000690***	-0.001000
	(0.000155)	(0.000215)	(0.000223)	(0.000677)
Turnover	1.52e-08*	1.31e-08	1.73e-08**	2.55e-08
	(8.07e-09)	(8.24e-09)	(8.57e-09)	(3.52e-08)
Birth year	0.0390***	0.0262***	0.0243***	0.0434***
	(0.00383)	(0.00454)	(0.00476)	(0.0118)
Single site enterprise	1.267***	1.607***	1.556***	0.723*
	(0.115)	(0.197)	(0.204)	(0.374)
Number of local units	-0.000684***	-0.000522***	-0.000779***	-0.00163
	(0.000200)	(0.000195)	(0.000238)	(0.00131)
Wage level	6.48e-05*	0.000109**	0.000209*	4.74e-05
	(3.43e-05)	(4.57e-05)	(0.000116)	(0.000138)
Consumer price level	-0.0816**	-0.110**	-0.0999	0.0291
	(0.0370)	(0.0494)	(0.0748)	(0.159)
GVA per head	-2.09e-07***	-2.02e-07***	-1.90e-07***	-9.03e-08
	(5.92e-08)	(6.85e-08)	(7.10e-08)	(1.71e-07)
Rural	-0.142	-0.343	-0.353	0.290
	(0.239)	(0.328)	(0.720)	(0.751)
Russell Group university	-0.184*	-0.253*	-0.236	-0.944**
	(0.102)	(0.136)	(0.147)	(0.443)
Index of Multiple Deprivation	-0.0355***	-0.0401***	-0.0364***	-0.0209
	(0.00407)	(0.00537)	(0.00663)	(0.0136)
Rainfall	-0.00606***	-0.00553***	-0.00547**	-0.0108
	(0.00146)	(0.00191)	(0.00270)	(0.00705)
Post crises	0.544***	0.680***	0.720***	
	(0.133)	(0.168)	(0.183)	
Time trend	-0.119***	-0.139***	-0.177***	
	(0.0274)	(0.0348)	(0.0537)	
Immediate foreign owner		-0.108	-0.0931	
		(0.0845)	(0.0883)	
Commerical property prices			-0.0127	
			(0.0140)	
Travel time to closest railway station			0.0162*	
			(0.00903)	
Travel time to closest airport			-0.0240**	
			(0.0111)	
Travel time to closest road junction			-0.000647	
			(0.00301)	
Constant	-74.68***	-47.39***	-44.68***	-94.84***
	(8.213)	(9.884)	(12.24)	(26.75)

	Random Effects		
	1	2	3
Manufacturing	-0.00227***	-0.00172**	-0.00168*
	(0.000777)	(0.000781)	(0.000874)
Information and communication	-0.000653	-0.000795	-0.000700
	(0.00101)	(0.000969)	(0.00106)
Financial and insurance activities	-0.00132	-0.00102	-0.000519
	(0.00118)	(0.00111)	(0.00122)
Professional, scientific and technical activities	-0.000874	-0.000455	-0.000380
	(0.000842)	(0.000854)	(0.000942)
Number of employees	-1.60e-06***	-9.60e-07	-8.41e-07
	(6.11e-07)	(6.04e-07)	(6.56e-07)
Turnover	5.08e-11	0	5.99e-11
	(0)	(0)	(0)
Birth year	0.000175***	9.16e-05***	9.04e-05***
	(2.90e-05)	(2.75e-05)	(3.08e-05)
Single site enterprise	0.0230***	0.0274***	0.0268***
	(0.00165)	(0.00258)	(0.00272)
Number of local units	-1.22e-06	-1.09e-06	-1.52e-06**
	(7.47e-07)	(6.83e-07)	(7.59e-07)
Wage level	-2.63e-07	5.30e-07	9.31e-07*
	(3.99e-07)	(4.85e-07)	(5.09e-07)
Consumer price level	-0.00306***	-0.000807	-0.000724
	(0.000550)	(0.000578)	(0.000510)
GVA per head	-8.38e-10**	-8.15e-10**	-8.40e-10**
	(3.64e-10)	(3.52e-10)	(3.75e-10)
Rural	-0.00134	-0.00472**	-0.00360
	(0.00189)	(0.00189)	(0.00433)
Russell Group university	-0.00155*	-0.00193**	-0.00151*
	(0.000812)	(0.000799)	(0.000896)
Index of Multiple Deprivation	-0.000232***	-0.000238***	0.000231**
	(4.12e-05)	(4.08e-05)	(4.56e-05)
Rainfall	1.33e-05	1.19e-05	-2.02e-05
	(1.39e-05)	(1.52e-05)	(1.44e-05)
Post crises	0.000866	0.00140*	0.00259***
	(0.000680)	(0.000728)	(0.000781)
Time trend	7.22e-07	-0.000405*	0.000688**
	(0.000207)	(0.000240)	(0.000239)
North East	-0.0330***	-0.00332	
	(0.00630)	(0.00256)	
North West	-0.0328***	-0.00434*	
	(0.00603)	(0.00231)	
Yorkshire and the Humber	-0.0313***	-0.000755	
	(0.00655)	(0.00276)	
East Midlands	-0.0278***	-0.00268	
	(0.00559)	(0.00222)	
West Midlands	-0.0241***	9.41e-05	
	(0.00507)	(0.00207)	
East	-0.0219***	-0.00322*	
	(0.00451)	(0.00193)	
South East	-0.0167***	-0.00166	
	(0.00369)	(0.00162)	
South West	-0.0292***	-0.00432**	
	(0.00551)	(0.00217)	
Wales	-0.0319***	-0.00329	
	(0.00631)	(0.00255)	
Scotland	-0.0290***	-0.00320	
	(0.00530)	(0.00216)	
Northern Ireland	-0.0307***	-	
	(0.00651)	-	
Immediate foreign owner		-0.000500	-0.000566
		(0.000479)	(0.000531)
Commerical property prices			-3.22e-05
			(6.90e-05)
Travel time to closest railway station			-5.80e-07
			(6.70e-05)
Travel time to closest airport			-4.71e-06
			(8.61e-05)
Travel time to closest road junction			-1.17e-05
			(2.22e-05)
Constant	-		-0.111
	-		(0.0801)

	Logit Random Effects		
	1	2	3
Manufacturing	-0.523***	-0.414***	-0.452***
	(0.0969)	(0.125)	(0.132)
Information and communication	-0.187	-0.230	-0.235
	(0.119)	(0.152)	(0.155)
Financial and insurance activities	-0.520***	-0.384**	-0.300
	(0.168)	(0.194)	(0.195)
Professional, scientific and technical activities	-0.237**	-0.152	-0.152
	(0.0992)	(0.130)	(0.133)
Number of employees	-0.000452***	-0.000686***	-0.000678***
	(0.000163)	(0.000224)	(0.000232)
Turnover	1.68e-08*	1.43e-08	1.90e-08**
	(8.79e-09)	(8.97e-09)	(9.30e-09)
Birth year	0.0404***	0.0267***	0.0244***
	(0.00425)	(0.00499)	(0.00518)
Single site enterprise	1.422***	1.787***	1.713***
	(0.138)	(0.238)	(0.241)
Number of local units	-0.000685***	-0.000538***	-0.000799***
	(0.000210)	(0.000208)	(0.000249)
Wage level	6.43e-05*	0.000114**	0.000226*
	(3.85e-05)	(5.04e-05)	(0.000123)
Consumer price level	-0.0819**	-0.116**	-0.0965
	(0.0416)	(0.0545)	(0.0813)
GVA per head	-2.21e-07***	-2.11e-07***	-2.01e-07***
	(6.37e-08)	(7.35e-08)	(7.55e-08)
Rural	-0.168	-0.442	-0.418
	(0.263)	(0.357)	(0.779)
Russell Group university	-0.201*	-0.283*	-0.255
	(0.113)	(0.148)	(0.158)
Index of Multiple Deprivation	-0.0383***	-0.0424***	-0.0388***
	(0.00461)	(0.00597)	(0.00726)
Rainfall	-0.00639***	-0.00555***	-0.00563*
	(0.00163)	(0.00209)	(0.00290)
Post crises	0.580***	0.703***	0.744***
	(0.140)	(0.175)	(0.191)
Time trend	-0.121***	-0.145***	-0.186***
	(0.0294)	(0.0371)	(0.0567)
Immediate foreign owner		-0.135	-0.119
		(0.0933)	(0.0965)
Commerical property prices			-0.0145
			(0.0149)
Travel time to closest railway station			0.0158
			(0.00997)
Travel time to closest airport			-0.0229*
			(0.0123)
Travel time to closest road junction			-0.00102
			(0.00332)
Constant	-78.72***	-49.25***	-46.72***
	(9.129)	(10.87)	(13.29)

	Historical behaviour	
Model	15	16
Manufacturing	-0.000254	-0.217
	(0.00154)	(0.615)
Information and communication	-0.000867	-0.109
	(0.00217)	(0.839)
Financial and insurance activities	-0.000203	-0.186
	(0.00237)	(1.164)
Professional, scientific and technical activities	0.00339*	1.094*
	(0.00180)	(0.570)
Number of employees	-7.43e-07	-0.000479
	(1.09e-06)	(0.000906)
Turnover	0	3.92e-08
	(1.17e-10)	(5.59e-08)
Birth year	7.23e-05	0.0387
	(6.44e-05)	(0.0300)
Single site enterprise	-0.00505	
	(0.0505)	
Number of local units	-1.16e-06	-0.0473
	(1.99e-06)	(0.0298)
Wage level	1.07e-06	0.000277
	(7.27e-07)	(0.000245)
Consumer price level	-0.000564	-0.156
	(0.000733)	(0.270)
GVA per head	-7.76e-10	-2.14e-05*
	(7.38e-10)	(1.22e-05)
Rural	-0.00125	
	(0.00331)	
Russell Group university	-0.00349**	
	(0.00160)	
Index of Multiple Deprivation	1.23e-05	-0.00286
	(7.74e-05)	(0.0247)
Rainfall	0.000524*	-0.0384**
	(0.000301)	(0.0188)
North East	-0.0103*	
	(0.00539)	
North West	-0.0251*	
	(0.0131)	
Yorkshire and the Humber	-	
East Midlands	0.000160	
	(0.00243)	
West Midlands	-	
East	0.00429	
	(0.00367)	
South East	0.00103	
	(0.00212)	
South West	-0.0189**	
	(0.00933)	
Wales	-0.0285*	
	(0.0149)	
Scotland	-0.0352*	
	(0.0184)	
Northern Ireland	-0.0141*	
	(0.00775)	
Employment expansion	0.00120	0.478
	(0.00177)	(0.621)
Employment contraction	0.00660***	1.649***
	(0.00222)	(0.551)
Turnover expansion	7.80e-06	0.159
	(0.00118)	(0.467)
Turnover contraction	-0.000277	-0.280
	(0.00224)	(0.792)
Pevious relocation	0.0180***	2.030***
	(0.00374)	(0.585)
Constant	-0.147	-72.02
	(0.140)	(63.21)

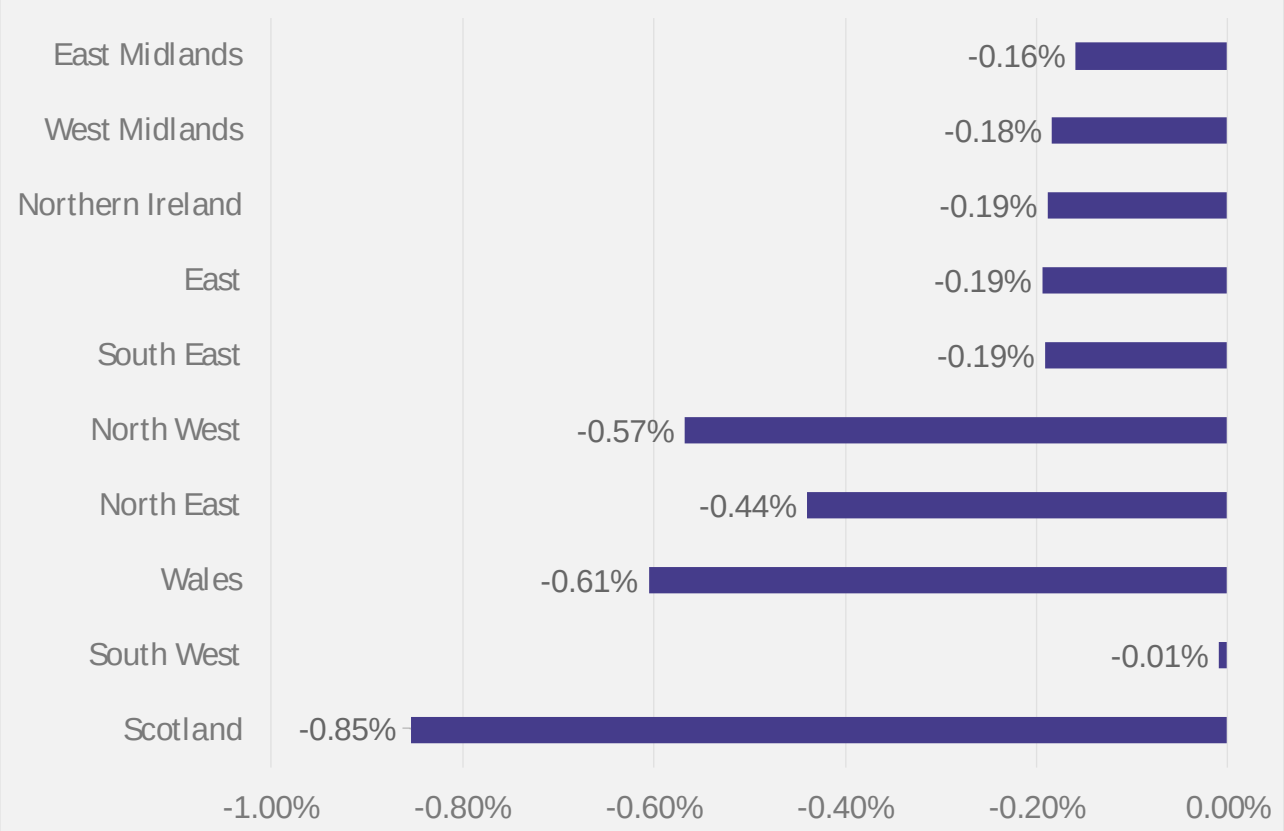
	Different geographic	
Model	17	18
Manufacturing	-0.00111***	-0.00449***
	(0.000295)	(0.000599)
Information and communication	-0.00111***	0.000704
	(0.000391)	(0.000796)
Financial and insurance activities	-0.00124***	-0.00256***
	(0.000461)	(0.000937)
Professional, scientific and technical activities	-0.000586*	-0.00141**
	(0.000329)	(0.000669)
Number of employees	-3.70e-07	-2.04e-06***
	(2.71e-07)	(5.52e-07)
Turnover	0*	1.03e-10**
	(0)	(0)
Birth year	9.56e-05***	0.000277***
	(1.15e-05)	(2.34e-05)
Single site enterprise	0.0101***	0.0355***
	(0.000901)	(0.00183)
Number of local units	-6.46e-07*	-3.75e-06***
	(3.53e-07)	(7.18e-07)
Wage level	-3.26e-08	-2.27e-06***
	(3.19e-07)	(6.48e-07)
Consumer price level	0.000231	0.00393***
	(0.000296)	(0.000601)
GVA per head	-6.73e-10***	-2.47e-09***
	(1.52e-10)	(3.09e-10)
Rural	0.000307	-0.00108
	(0.000725)	(0.00147)
Russell Group university	0.000194	0.000239
	(0.000323)	(0.000657)
Index of Multiple Deprivation	-8.64e-05***	-6.50e-05**
	(1.61e-05)	(3.28e-05)
Rainfall	4.33e-06	1.65e-05
	(1.14e-05)	(2.31e-05)
Post crises	0.000594	0.00168
	(0.000559)	(0.00114)
Time trend	-8.16e-05	0.000446
	(0.000167)	(0.000339)
North East	-0.000628	-0.00381**
	(0.000893)	(0.00181)
North West	-0.000400	-0.00255*
	(0.000750)	(0.00152)
Yorkshire and the Humber	-	-
East Midlands	-0.000152	-0.00689***
	(0.000858)	(0.00174)
West Midlands	-0.000587	-0.0120***
	(0.00107)	(0.00217)
East	0.000436	-0.00934***
	(0.000808)	(0.00164)
South East	-0.000422	-0.00931***
	(0.000570)	(0.00116)
South West	-0.00149	-0.00977***
	(0.000915)	(0.00186)
Wales	-0.000537	-0.00843***
	(0.00113)	(0.00229)
Scotland	-0.00260***	-0.00915***
	(0.000989)	(0.00201)
Northern Ireland	-0.000836	-0.00463**
	(0.00108)	(0.00219)
Constant	-0.208***	-0.872***
	(0.0316)	(0.0642)

Impact of regional dummies on probability of relocation

In relation to location characteristics, as shown below, we note that the regional dummies are often relatively large, compared to the effect of the other significant explanatory variables. This could be a result of the mix of firms in the different regions, that isn't already controlled for by other variables.

In Figure 35 below, we calculate the change in the probability of relocation resulting from a change in the regional dummy variables switching 'on/off', where we take the average results of the OLS econometrics estimation of model specifications 1 to 4.

Figure 35: Average magnitudes of effects on probability of relocation based on change in regional dummies 'off'/'on'



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