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HUMAN RESOURCE MANAGEMENT DIFFUSION AND PRODUCTIVITY IMBALANCES

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The use of the WERS, REPONSE and APS data does not imply the endorsement of the WERS sponsors, DARES, the ONS or the Secure Data Service in relation to the interpretation or analysis of the data. This work uses UK research datasets which may not exactly reproduce National Statistics aggregates.

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Executive Summary

It is widely acknowledged that the UK has a particularly long tail of low-productivity regions. In the UK's most productive region (London), output per person is around 75 per cent higher than in its least productive region (Wales). Moreover, the extent of this regional imbalance is greater in the UK than in many other advanced nations.

In this study, we explore spatial variance in management practices and assess its potential contribution to regional imbalances in productivity. We focus on the investments firms make in their Human Resource Management (HRM). The term is used as a label for a distinctive array of practices which firms might use to achieve competitive advantage through the efficient management of their employees and the organisational processes in which they are involved. Such practices include incentive pay, performance evaluation, team-working, target-setting and the use of just-in-time production processes.

The research builds on a growing body of evidence which indicates that differences in management practices can account for a substantial share of cross-country differences in total factor productivity, and which identifies an important role for management practices in explaining differences in productivity between firms in the UK. We contribute to this literature by studying regional variation in HRM and related management practices using workplace-level (i.e. plant-level) data in Britain, taken from the Workplace Employment Relations Survey (WERS). We use these data to map spatial variance in HRM intensity in Britain. We then seek to account for that variance and, in doing so, establish whether regional variance in HRM can help to account for regional variance in productivity. This analysis is complemented by a comparative investigation of equivalent data for France, where levels of productivity and HRM are both higher and less dispersed.

The underlying conceptual framework for the analysis treats HRM as a technology that can be adopted by firms as a means of improving the efficiency of production. However, it is a technology associated with non-protected codified knowledge and tacit knowledge, and also a network good. Its distinct multi-dimensional nature has the potential to explain why innovative HRM can deliver higher productivity on average, and yet at the same time, only a portion of all workplaces/firms (within a region, say) are able, or have the incentive, to adopt HRM practices.

We explore the possibility that the adoption of HRM may be affected by the nature and extent of interaction between the host workplace and other workplaces in its locality, market and supply chain. 'Spillovers' from others' adoption of HRM, which include 'network effects', have the potential to give rise to spatial variations in productivity, in much the same way as human capital externalities may give rise to spatial variation in wages. Identifying the role of externalities in the adoption of HRM helps us to understand regional variation in HRM intensity to a greater extent than hitherto and, as a consequence, may contribute to a better understanding of the causes of regional productivity imbalances.

Our measure of HRM captures the incidence of 12 specific practices, across three sub-groups. The first group of practices comprises performance appraisal, incentive pay, profit-sharing and employee share ownership schemes. These practices seek to ensure that employees have the knowledge and skills required by the organisation, and that they are motivated to contribute towards organisational success. The second group comprises practices relating to the organisation of work within the firm, specifically covering the use of semi-autonomous team-working, employee involvement in problem-solving, just-in-time processes and the use of ICT. The third group focuses on the use of organisational performance targets, whereby the

workplace might set goals for the volume of sales, profits, labour costs and so on. The use of such targets alerts managers to potential problems and to the need for appropriate actions. The bulk of our analysis uses a simple index, counting the number of such practices in use at the workplace and taking this as a measure of 'HRM intensity'.

Focusing first on the overall extent of use of HRM in the two countries, we see that there is a higher level of HRM intensity, on average, across workplaces in France than in Britain. The mean number of practices in use across our private sector workplace sample is 5.5 in Britain and 6.4 in France (the median values are 6 and 7 practices respectively). The gap is not restricted to any one domain of HRM; instead, it is apparent across all three.

Taking a spatial perspective and examining the dispersion of workplace means across high-level regions (NUTS1), we find that the spatial variance is much smaller in France. In France, the highest-scoring region is only one point ahead of the lowest-scoring region on the HRM intensity index. In contrast, the range in Britain is at least two full points. The implication is that Britain's lower aggregate score is driven in large part by a tail of peripheral regions in which average HRM intensity is notably weak.

The ranking of regions in terms of HRM intensity bears many similarities to the equivalent ranking of Britain and France's regions on the basis of their labour productivity. Indeed, in a pooled analysis of the NUTS1 regions in the two countries, we find a strong cross-sectional correlation between regional HRM intensity and regional labour productivity. Focusing only on Britain and disaggregating to NUTS3 level, we find that a one-unit increase in a region's HRM score is associated with a labour productivity increase of around £3,500 per person employed.

This analysis is, to our knowledge, the first to show a clear correlation between management practice and productivity at regional and sub-regional level in Britain. The results are some way from providing estimates of the independent association between regional management practice and regional productivity, and even further from identifying a causal link between the two. However, they suggest that management may play some substantive role in contributing to regional productivity differentials

The research then turns to question of why some workplaces (and by extension, regions) may have higher levels of HRM intensity than others. To answer this question, the analysis moves to the workplace level.

We identify a number of universally relevant factors which are associated with HRM diffusion in both Britain and France. These include product market competition, participation in international markets and membership of networks for knowledge sharing. Along with workplace demographic characteristics such as size and ownership patterns, these factors account for around half of the difference between the highest and lowest-HRM regions in Britain and around one third of the equivalent difference in France.

A pattern remains whereby regional HRM intensity falls as one moves further away from London – something which is not observed in France, possibly because of its strong regional cities. However, the differences in HRM intensity across Britain's NUTS1 regions are further reduced – and become statistically non-significant – when we augment our analyses with indicators of the density of employment and of the availability of well-qualified managers and non-managerial employees in the local area.

The association with the employment density of the workplace's NUTS3 region is unexpectedly negative, suggesting that workplaces may find other ways to gain competitive advantage in spatially concentrated markets, other than moving to the frontier in terms of workplace

management. The positive association between workplace HRM intensity and the availability of qualified managers and employees in the local area is in line with other recent evidence, however, and suggests that workplaces benefit from higher levels of skill in other local firms, perhaps because it implies a greater availability of local knowledge about best-practice management (or means of implementing it), which the workplace can absorb via its participation in either formal or informal networks.

In our final set of analyses, we investigate the potential role of production networks (buyer-supplier relationships) in aiding the diffusion of HRM. We proxy these connections with other industries using industry-level supply-use tables and find that workplace HRM is positively associated with the level of HRM in other firms in its industry and with HRM in its likely downstream supply chain. These results are, again, suggestive of spillover (or network) effects.

Our findings therefore go some way towards identifying relevant policy initiatives which may assist in reducing regional imbalances. First, they provide support for long-standing policy initiatives to foster greater competition, to encourage firms to expand into international markets and to support the provision of tertiary education. In the latter case, it would appear that improving local skill levels not only benefits the direct employers of those qualified workers, but also benefits other firms in the locality.

The findings also provide support for initiatives to foster knowledge sharing and network development. This can involve supporting the work of knowledge brokers, such as trade associations. It can also involve supporting the work of institutions which are seeking to connect frontier firms with less well-managed firms, e.g. along supply chains or in local areas, for the explicit purpose of knowledge sharing. However, building the incentives for firms to participate in such activities is likely to be key to their overall success.

1. Introduction

Background

It is well-known that there is a substantial productivity differential between the UK and many other advanced economies. For instance, the latest estimates from the Office for National Statistics (ONS) indicate that GDP per hour in the UK is 23 per cent lower than in the US and France, and 26 per cent lower than in Germany (ONS, 2018a). One reason for this is the high degree of regional dispersion in productivity levels within the UK, with the extent of the regional imbalance being greater in the UK than in many other advanced nations (ONS, 2018b). In the UK's most productive region (London), GDP per person employed is around 75 per cent higher than in its least productive region (Wales) (ONS, 2018b: Figure 1). Put simply, the UK appears to have a particularly long tail of low-productivity regions.[1]

Spatial productivity differentials partially reflect differences in natural resource endowments, history and culture. However, variations in the investments made by corporations and governments in infrastructure, human capital and other productivity-enhancing factors of production also play a significant role (see Rice et al, 2006; Webber et al, 2009; CBI, 2016; Gal and Egeland, 2018). Among these investments, there is an increasing recognition of the role played by management practices (CBI, 2016: 35-41; HM Government, 2017: 169-171; CBI, 2019).

In this study, we explore spatial variance in management practices and assess its potential contribution to regional imbalances in productivity in Britain. We focus in particular on the investments firms make in their Human Resource Management (HRM). Comparisons are made with the situation in France, where levels of productivity and HRM are both higher and less dispersed.

Existing evidence

Bloom et al (2014, 2017) show that there is a strong correlation at national level between the number of management practices typically in use and national productivity, with their firm-level data suggesting that differences in management practices can account for about 30 per cent of cross-national differences in total factor productivity. Estimates further suggest that differences in management practices between firms can account for over one quarter of the 90-10 spread in TFP between manufacturing firms within the UK (Bloom et al, 2017: Table 9). Moving from the median to the 75th percentile in the distribution of management scores is associated with a 12 per cent increase in GVA per worker (ONS, 2018c). Moreover, the positive association between management practices and firm performance stands up in longitudinal analyses, where fixed unobservable differences across firms can be accounted for, and complementary evidence from randomized controlled trials gives good reason to think that these associations are causal (see Bloom et al, 2017: 17).

[1] Further firm-level analysis by ONS (2017a) confirms that this regional dispersion in the UK is not simply a product of regional differences in industry mix.

The firm-level data used in such studies are limited in the extent to which they can speak to the debates around regional imbalances, however, since they can only be linked to regional productivity differentials in the case of single-plant firms.[2]

Our contribution

We contribute to this literature by studying regional variation in HRM and related management practices using workplace-level (i.e. plant-level) data in Britain, taken from the Workplace Employment Relations Survey (WERS) (Department for Business Innovation and Skills et al, 2018). WERS is a national survey of establishments, carried out in 2011, which provides us with rich information on over 1,500 private sector workplaces in Britain, including their management practices, ownership patterns, product market circumstances and demographic characteristics.[3] We use these data to map spatial variance in HRM intensity in Britain. We then seek to account for that variance and, in doing so, seek to establish whether regional variance in HRM can help to account for regional variance in productivity.

We augment this analysis with a comparative investigation of equivalent data for France. The comparison is valuable because France has a notable productivity lead over the UK, but also a lower degree of variance in productivity across its regions (ONS, 2018b). The French Enquête Relations Professionnelles et Négociations D'Entreprise (REPONSE) (DARES, 2013) was carried out in the same year as WERS (2011) to a very similar methodology. Although the two surveys were not explicitly harmonised in the design phase, they were developed through an informal collaboration and have many core features in common – including a large number of comparable questions.[4] Comparative analysis of WERS and REPONSE thus enables us to explore a number of questions around the potential uniqueness of the UK situation.

Our analysis is underpinned by a conceptual framework which sees HRM as a technology that can be adopted by firms as a means of improving the efficiency of production. Our conceptual framework allows for the possibility that the adoption of HRM may be affected by the nature and extent of interaction between the host workplace and other workplaces in its locality, market and supply chain. 'Spillovers' from others' adoption of HRM, which include potential 'network effects', have the potential to give rise to spatial variations in productivity, much in the same way as human capital externalities may give rise to spatial variation in wages (Winter, 2018). Identifying the influence of such network effects on the adoption of HRM may thus help us to understand regional variation in HRM intensity to a greater extent than at present and, as a consequence, may help us to further understand regional productivity imbalances.

In summary, we find that there is considerable regional variance in HRM intensity in Britain. This regional variance is positively correlated with regional differences in productivity. The extent of spatial variance in HRM intensity is larger in Britain than in France, and some part of this difference can be attributed to greater variance in the composition of Britain's regions. However, there are also a number of universally relevant factors which are associated with HRM diffusion in both countries. These include product market competition, participation in international markets and membership of networks for knowledge sharing. When we combine

[2] An investigation of the 350 single-plant manufacturing firms in the 2016 ONS Management Practices Survey found no clear evidence of regional variation in management practices, once other firm characteristics had been controlled for (ONS, 2017b), though the authors were at pains to emphasise the difficulties of generalising from their particular sample.
[3] For further details on WERS, see: http://www.wers2011.info/.
[4] For further details on REPONSE, see: http://dares.travail-emploi.gouv.fr/dares-etudes-et-statistiques/enquetes-de-a-a-z/article/relations-professionnelles-et-negociations-d-entreprise-reponse-edition-2010

these characteristics with information on the local skills supply and the position of the workplace in production networks – indicative of 'spillover' effects from the area or industry in which the workplace is located – we are able to explain much of the regional variance in HRM intensity in Britain. Our results therefore go some way towards identifying relevant policy initiatives which may assist in reducing regional imbalances.

The structure of the report

The remainder of the report proceeds as follows.

Chapter 2 outlines our conceptual framework for understanding the nature of HRM and the likely influences on its diffusion. Specifically, we consider whether HRM can best be thought of as a technology to be deployed by firms to improve productivity and, if so, how it features in firms' production functions. Here we draw on recent insights from the economics literature that characterise HRM as a technology that is universally applicable across firms, but with returns that may differ across firms according to their characteristics and market circumstances. We go further than the existing literature in examining what sort of technology HRM might be and the implications this has for its diffusion across firms and across geographies. One aspect of this discussion is to consider spatial dispersion in HRM. Here, we review the literature on the spatial dimension to innovation and technology diffusion, drawing particularly from the literature on the role of agglomeration and clusters, in order to inform our understanding of the diffusion of HRM.

Chapter 3 introduces our data and outlines our approach to analysis. Chapters 4-6 then present the results of our empirical analyses.

In Chapter 4 we present descriptive evidence on the variance in HRM intensity in Britain, with a focus on the regional dimension, alongside equivalent comparative evidence from France. In Chapter 5, we present analyses showing the correlation between a region's HRM investments and its level of labour productivity (GVA per employee). This serves to further motivate our workplace-level analysis of the factors that are associated with HRM adoption, which is presented in Chapter 6.

Chapter 7 summarises our findings and concludes with a discussion of policy implications.

2. What is HRM and what might limit its diffusion?

Introduction

We use the term ‘human resource management’ as a label for a distinctive array of practices which firms might use to achieve competitive advantage through the efficient management of their employees and the organisational processes in which they are involved. Such practices – which include incentive pay, performance evaluation, team-working, target-setting and the use of just-in-time production processes – have attracted considerable attention in the literature on Economics, Management Science and Industrial Relations in recent years. Since the 1990s, a number of influential papers (e.g. MacDuffie, 1995; Ichniowski et al, 1997; Black and Lynch, 2001) have explored the diffusion of ‘innovative HRM practices’ and the returns that firms may obtain from their use, focusing on the nature of these practices, how they affect the social and productive performance of firms, and what may affect their take-up.

In this chapter, we consider the nature of HRM in more detail, with a particular focus on the implications for its diffusion.

What is HRM?

We focus on HRM and related management practices across three broad groups (see table 1). In so doing, we take our cue from the long-standing literature examining the links between firm performance and firms’ use of operational and human resource practices (see, for example, MacDuffie, 1995; Ichniowski et al, 1997; Lazear, 2000; Black and Lynch, 2001; Combs et al, 2006; Bloom et al, 2017; Brynjolfsson and McElheran, 2016a).

The first group of practices that we focus on comprises performance appraisal and incentive pay. These practices seek to ensure that employees have the knowledge and skills required by the organisation, and that they are motivated to contribute towards organisational success. They thus address the ‘ability’ and ‘motivation’ elements of the Ability-Motivation-Opportunity (AMO) framework of Bailey (1993) and Appelbaum et al (2000), which is a common reference point in the HRM-performance literature.

The second group comprises practices relating to the organisation of work within the firm, specifically covering the use of semi-autonomous team-working, employee involvement in problem-solving, just-in-time processes and the use of ICT. The first two practices in this set are focused around ensuring that employees have the opportunity to deploy their skills and tacit knowledge effectively (the final part of the AMO framework), whilst the use of just-in-time processes reflects efficiency concerns that are prominent in the operations management literature. Just-in-time processes are also complementary to various human resource practices, such as employee involvement (Power and Sohal, 2000).

Table 1: HRM and related management practices

Domain	Practice	Type	Aims
Incentives	Performance appraisal	HRM	Check that employee skills meet organization requirements
	Incentive pay	HRM	Attract more-able workers, forge individual and collective engagement and promote loyalty
	Employee share ownership	HRM	
Organisation of work	Teamworking	HRM	Deploy skills and diffuse knowledge
	Problem solving	HRM	
	Just-in-time	Process	Lowers inventory costs and decreases waste. Complementary to various HR practices
	Use of ICT	Equipment	Aids data management and organisational co-ordination, collaboration and connectivity. Complementary to various HR practices
Target setting	Workplace performance targets	HRM/Process	Set clear objectives and information for managers

The final group of practices focuses on the use of organisational performance targets, whereby the workplace might set goals for the volume of sales, profits or labour costs. The use of such targets helps managers to stay informed about whether the organisation is performing appropriately: alerting them to potential problems and to the need for appropriate actions. The use of such performance targets is a key part of the emerging literature on data-driven management practices (Brynjolfsson and McElheran, 2016a, 2016b).

A large corpus of evidence within industries, across industries and between countries finds positive correlations between the adoption of HRM and related practices and productivity (see above). There is debate about the mechanisms linking HRM and firm performance: it may act through improved involvement of workers, through technical complementarity with ICT or through enhanced employee motivation, for example. Irrespective of the mechanisms, if these practices are productivity-enhancing for firms, the question remains as to why they have not been more widely adopted? The nature and properties of human resource (HR) practices provide some potential means of understanding this partial adoption.

Innovative HRM is a technology associated with higher productivity performance

There is a common view that management and organisational practices – specifically innovative ones – are a technology, since they aim to improve the efficiency of the productive factors used by the firm. This includes, most obviously labour, but also capital, and the interaction between the two.

Intangible capital or intangible resource?

For some scholars and practitioners, innovative HRM can be viewed as an intangible form of capital, that is, a non-physical form of capital similar to patents (Corrado and Hulten, 2010). Bloom et al (2017) offer a generic model for this framework: the production function is A.F(K,L,M) where A is an efficiency term, L is labour, K "standard" capital, and M the management capital. Without loss of generality, we can consider that locally this function is separable $A.F(K,L,M) \cong A.G(M).f(K,L)$; then the usual total factor productivity measure - ln(TFP) computed as the residual of a log linear function of K and L - is $\ln(A)+\ln(G(M))$. Productivity thus depends on M.

In this framework, M is the result of a cumulative process of various investments and switching costs including, for example, the adaptation of the payroll system and the physical reorganisation of a plant or a store. The process is usually incremental but can involve radical changes in the medium term. Mechanically, the age of the workplace/firm is then a determinant of the level adoption of innovative HR practices: an older firm or a larger firm is expected to have accumulated more management capital.[5]

As a form of intangible capital, the value of the stock of management capital can be measured as a discounted sum of the spending in external HR consultants and the wages of in-house HR specialists. This methodology can be used at the firm level or at an aggregated level; for example, the INTAN-INVEST database provides estimates of intangible "organizational capital" for 27 EU Countries and 2-digit industries (Corrado et al., 2012).

Alternatively, the stock of management capital can be measured in volume terms through the observations of selected work practices; specific employer/employee surveys such as WERS and REPONSE provide such direct observations across industries. This approach is more conservative since it does assume a given structural formation of an HR stock and a qualitative equivalence of the HR investment (note that firms may use their spending on HR consultants or specialists to quite different ends). It is also tractable in a Resource-Based perspective of strategic HRM (Wright et al., 2001), which sees the eventual HR practices that are in place within the firm as the source of competitive advantage.

Within the resource-based view, a firm can obtain a sustainable competitive advantage by mobilising all its tangible and intangible resources.

Tangible resources are tangible factors of production – land, buildings, low, middle or high-skilled labour – but also patents or trademarks (which are intangible capital). These tangible resources can be easily quantified and can be rented, lent or traded, separately (they are separable from the firm). By contrast, intangible resources are mostly embodied in the firm

[5] Note that workplaces are younger, on average, in Britain than in France; this may therefore have implications for aggregate rates of HRM adoption.

and its workers. One classic example outside the HRM zone would be the trust-relations that the firm builds up with its suppliers.

Innovative HRM practices typically fall into this latter category of 'intangible resources'. One might argue that this is a more appropriate categorisation than to consider HRM as intangible capital. Fundamentally, when a firm dies, intangible forms of capital such as patents are protected and still valuable and can be used directly by another firm, while any forms of innovative organization (such as HRM) vanish. The only way in which they may survive is through transfer to other firms in the form of the managerial knowledge of displaced workers.

This prompts some consideration of the common distinction between "codifiable" knowledge and "tacit" knowledge. In the zone of HRM, total quality management can typically be considered 'codified knowledge' in that its implementation typically conforms to a codification of the production process often associated with ISO norms. By contrast, most other forms of HRM can be considered tacit knowledge. For instance, performance-related pay (PRP) systems may be observable to the outsider and described in firm handbooks, however the know-how required to implement and optimise them within a given firm is very difficult to codify. Similarly, the underlying purpose of people-based practices such as team working is to share tacit knowledge, and thereby to generate a virtuous circle of HR innovations. In these cases, the 'tacit knowledge' can properly be considered as a resource to the firm, but it cannot reasonably be considered as a form of capital: it is rather, a public good or a good belonging to external organizations (consultants) or alternatively, a non-protected competency embedded in workers.

HRM thus embodies some features or characteristics that may serve to make diffusion more limited than in the case of other technologies. These features also mean that the rate of diffusion is likely to be affected by a variety of situational factors (or 'determinants').

Potential determinants of HRM diffusion

Age, size and market conditions

In the resource-based approach, the accumulation of HR investments does not necessarily follow a linear path. For example, it can lead to the emergence of a bureaucracy that may disrupt the diffusion of innovative work practices or magnify the switching costs. Under this line of argument, older organisations may incur higher costs than new organisations in changing their HR practices (as in 'putty-clay' models of organisational redesign – see Sorkin, 2015), and older organisations are then not necessarily the most innovative. Organisation size also plays a role because larger firms can spread the costs of HR investments across more plants. Note that evidence on British and French workplaces using WERS and REPONSE suggests that the youngest and oldest establishments exhibit the lowest levels of HRM intensity, but the size of the workplace or firm is positively-correlated with the adoption of innovative HR practices (e.g. Bryson et al., 2007; Askenazy and Forth, 2016).

In addition, it is not only the actual age or size of the workplace that matters for the implementation of innovative HRM, but also the expected longevity of the firm. If the expected lifespan of the firm is too short (as may be the case under highly competitive product market conditions), the current spending in developing innovative work organization will not be outweighed by future returns[6]. In the same way, high levels of employee turnover (as might

[6] Expected longevity has not been explored by the empirical literature on HRM.

occur in highly flexible labour markets) may expose firms to the loss of their tacit HR knowledge.

These properties help to reconcile mainstream claims that competition stimulates organisational change (e.g. Bloom et al, 2017) with the critical HR literature (e.g. Thompson 2013, Kaufman, 2015) which stresses the role of competition in forcing firms to focus on short-term profits rather than entering the learning process for improving HR practices.

Indeed, these properties generate a theoretical inverted-U-shape of the adoption of innovative HRM according to: (a) the degree of competition in the firm's market; and (b) the flexibility of the labour market. When the degree of product market competition between firms – or the competition for workers with HR skills – is too strong, the potential returns and the longevity of the firm are eroded and the firm just focuses on short-term profits; eventually, the firm will not switch to innovative HRM. Conversely, when the degree of product market competition is low, then the firm enjoys large rents and profitability, and has no incentive to change its organization and take risks. The lack of competition also impedes the entry of better-managed firms. Similarly, if the labour market is rigid, the employees can resist the introduction of more efficient/flexible HRM practices that might challenge their position; and the lack of mobility of workers from one firm to another limits one mechanism for inter-firm comparisons and one channel through which "best" practices might diffuse.

Organizational innovations might thus follow a theoretical pattern that is similar to the usual technological innovations in the Aghion et al. (2005) model. Extended versions of this model and some evidence on R&D investments suggest an interaction between size and competition: if innovations are costly relative to the size of the firm, competitive shocks have to be large enough to change innovation choices; therefore, the inverted-U-shape relationship becomes flatter and can even vanish altogether for small firms (Askenazy et al., 2013). In this perspective, public policy aiming to stimulate HR innovation by altering market competition would be ineffective for smaller firms if it does not reduce the costs of transferring HR practices.

Although this potential inverted-U shape according to competition (interacted with size) has been a feature of the literature on product/process innovations, it has not been explored in the empirical literature on HRM. Studies by Bloom and Van Reenen[7] using mainly data on medium-sized manufacturing firms find a positive correlation between competition and HR adoption. By contrast, in our own work using REPONSE and WERS, we do not find clear-cut correlations between HR adoption and the market share of firm; instead, the spatial size of their market (local, regional, national, international) is positively associated with more innovative practices. (Askenazy and Forth, 2016).

The qualitative nature of the competition can also influence HR choices. If it is based on the reactivity i.e. the ability to produce soon after innovation before being overtaken by its competitors, then the firm adopts innovative HR practices (see Askenazy et al, 2006 for example).

Networking and hybridization

In common with ICTs, one can also consider that most HR practices, including quality management, just-in-time production, target-setting and autonomous teamworking, boost the exchange of formal and informal information and knowledge between workers and between organisational units. Increasing adoption is thus characterised by the development of networks

[7] Bloom and Van Reenen (2010, 2016)

within the firm – both horizontally and vertically – and also by the development of networks along the supply chain. Focusing on the supply chain effects, Barnard et al (2019) have shown that firm-to-firm linkages in production networks can account for a substantial degree of heterogeneity in firm size.

A larger share of innovative firms also increases the pool of workers with relevant HR knowledge that can be poached by innovative competitors. In this view, HRM is a network good whereby returns increase with the number of workplaces or firms that adopt the relevant practices. In other words, network scale effects should emerge, with HR practices becoming more valuable as their usage increase.

Along with size and sunk costs mechanisms, these effects are consistent with the observation that innovative practices are more common in multi-establishment firms (e.g. Bryson et al., 2007 for Britain) and multinational corporations.

A vast literature in management and economics has scrutinised the behaviour of multinationals. They diffuse (or reverse diffuse) practices and incite managers to share their expertise, also suggesting that these network effects are large (see e.g. Doeringer et al., 2003 on Japanese transplants in UK and France; Edwards and Tempel, 2010, on reverse diffusion from German and British subsidiaries of American multinationals). In addition, their behaviour suggests that procedural and codifiable practices are more likely homogeneous across the organization. Conversely, more 'tacit' or 'human' practices, i.e. those focusing on the engagement of workers, are likely to be adapted to national social systems and cultures, leading to hybrid arrangements. The implementation of HR practices can thus be driven by the firm culture, as well. For example, evidence on France using the REPONSE survey shows that family firms provide more secure jobs (Bassanini et al., 2013) which can explain why they are less likely to use innovative practices.[8]

The network effects discussed above have the potential to generate multi-equilibria, in which one may see both low and high adoption in a given market/value chain, depending on the nature of the inter-connections between organisational units. Market effects can also fuel such polarization. For instance, if a growing number of firms adopt a reactive form of organization, or if there is a technological shock, this may shift the market to a time-based form of competition (rather than a simple price-based form). This then forces all firms to adopt the new form of reactive organization or to exit the market via a selection process (Askenazy et al., 2006).

Agglomeration economies

In considering the reasons for differences in HRM diffusion, one can also consider the spatial dimension. In broad terms, regions may vary in the composition of firms by industry, size, age, ownership and so on. This would generate regional disparities in HRM if adoption is more extensive in some types of workplace than in others (so-called 'compositional effects'). However, a key focus of the spatial economics literature is the extent to which firms may benefit from congregating together spatially, so-called agglomeration economies, with location then being a direct determinant of firm behaviour.

In the urban economics literature, spatial concentration generates 'agglomeration economies' which help firms to become more productive. Such concentrations may occur because a particular region has natural or man-made comparative advantages for a particular industry, or

[8] Two connected arguments can be given. The stable staff including managers can fear the uncertainty generated by organisational change. The family firm itself also can be reluctant to innovate because it dreads reputational damage if it has to sack workers (Lemos and Scur, 2018).

because some 'frontier' firms create locally-specific supply chains and specialisms which result in changes in local industry mix (e.g. the rise of the car industry in the Midlands and in Detroit).

The advantages of agglomeration include a critical mass of workers and infrastructure, and dense networks of other firms. These firms may aid productivity by acting variously as suppliers, collaborators, competitors or sources of knowledge.[9] However, the returns to increasing spatial concentration are non-linear, since increased concentration can also generate costs (notably higher land prices and congestion). As these costs rise, it ultimately becomes beneficial for firms to locate elsewhere (see Nathan and Overman, 2013: 386-7).

There are debates as to whether the benefits of spatial concentration come from specialisation of activities ('localization economies', which would yield numerous collaborators or competitors) or diversity of activities ('urbanization economies', which could aid the establishment of efficient supply chains). Nathan and Overman indicate that large global cities such as London derive benefits through both channels.

Gordon and McCann (2000) provide a more detailed exposition of these arguments, but make the additional point that the availability of external economies may itself discourage certain forms of internal investment by businesses or individuals (ibid, p.518), since firms in spatially concentrated markets can also gain competitive advantage through having access to a large customer base, a larger pool of specialised labour or efficient supply linkages with other nearby firms. This suggests a two-tailed hypothesis, whereby firms in densely concentrated regions may benefit from network-based knowledge sharing on the one hand but may lack the incentive to improve their HRM practices on the other because they can take advantage of agglomeration economies in other ways.

Evidence on knowledge spillovers

The question of whether spatial concentration aids knowledge spillovers has been investigated extensively using data on patent citations and R&D activities and, more recently, using data on social networks among inventors (see Crescenzi et al 2016 for a review and some evidence).[10] Early work suggested that spatial proximity was critical for knowledge spillovers to occur, such that these spillovers declined rapidly with increased distance.[11] More recent evidence (including that of Crescenzi et al, 2016) indicates a lesser role for spatial proximity. Instead, knowledge spillovers are shown to be primarily dependent on opportunities for communication and collaboration within the boundaries of the firm (e.g. between plants), and on the strength of interpersonal networks external to the firm.[12] Spatial proximity is of limited value if these other 'proximity conditions' are not met.

Carlino and Kerr (2015:.396) provide further evidence on the importance of intrafirm linkages between plants for industrial innovation, whilst Haldane (2018: 12) provides evidence on the degree of 'connectivity' between company boards and its links to firm productivity. Martin-Rios'

[9] Carlino and Kerr (2015: pp.368+) categorise the benefits of 'thick local markets' as coming from: (a) more opportunities for sharing (e.g. sharing specialised inputs or business services); (b) better matching (e.g. better matching of workers to firms); or (c) knowledge spillovers.

[10] Bloom et al (2018) show that the arrival of a large new firm is associated with improvement in other firms' management practices – something they put down to learning spillovers.

[11] Carlino and Kerr (p.362) summarise studies showing that both the benefit of close proximity, and the rate at which this benefit decays with distance, vary a lot by industry (e.g. large benefits in software, low in manufacturing; high decay in networked industries such as advertising). In general, no benefits are evidence after 10 miles.

[12] In our case, it would imply that we may see higher HRM adoption in plants belonging to firms whose HQs are in high-HRM regions. But the transmission will be affected by the degree of autonomy given to local branches (which we know to be higher in the UK).

(2014) study of social networks on a science park provides similar evidence of the role of inter-firm relationships in sharing knowledge about HRM.

Some studies suggest that worker mobility may be an important source of knowledge spillovers (see Carlino and Kerr, 2015: 385). Work in the US is documenting these worker flows (see Davis and Haltiwanger, 2014; Bjelland et al, 2011); see Haldane 2018: 13 for the UK. One strand of this 'mobility' literature focuses specifically on immigration, both as a source of knowledge for the host country, but also in terms of the potential for 'sending back knowledge' to the country of origin (see Carlino and Kerr, 2015: 393; also Andrews et al, 2017). Other studies show that some geographic features are salient, particularly proximity to universities (especially those producing high-quality research). There is plentiful evidence of localized knowledge spillovers from university R&D to commercial innovation by private firms (see Carlino and Kerr, 2015: 388). Bloom et al (2014) indicate that the adoption of management practices is associated with proximity to business schools. Another strand of empirical work suggests that knowledge spillovers are strongest in supply-chain linkages, and where incumbents have greater capacity to absorb ideas from outside the firm - perhaps by virtue of skill levels inside the firm.

Infrastructures for the diffusion of innovations

The 'hub and no spokes' thesis put forward by Haldane (2018) argues that the UK is lacking in diffusion infrastructure which can spread innovations out from the 'hub' of frontier firms. He contrasts the UK with Germany, where the Fraunhofer Institutes and Steinbeis system foster innovation and its diffusion.

Similarly in France, industrial strategy is built around regional centres which have the full mix of infrastructure and industry for the region. This has developed through a decentralization process which devolved significant power to communes, départements, and regions, and which developed regional hub metropoles as a priority. Although each metropolitan area benefits from frequent and high-speed transport connections to Paris, the implication is that local firms can also learn from a strong regional centre without having to look only to the capital.

The regional centres are supported by employers' organisations that are similarly organised on a regional basis, mimicking the decentralization of political power to regions. The 18 regional and 107 local Chambers of Commerce and Industry (CCI) are public establishments but managed by elected employers. They operate infrastructures that are common goods and resources for firms, including ports, airports and more than 100 business and engineering schools. CCIs thus serve to strengthen the cooperation of employers in a given region. Moreover, in most industries, the largest companies are active within the employer organisations, as almost all industries are covered by collective bargaining arrangements and opt-out clauses are limited. These industry arrangements should (at least in principle) provide further mechanisms for the dissemination of 'best practice' and serve to homogenise practices across France.

Haldane (2018: 21) argues that the UK needs to create better institutional spokes by: (a) disseminating best practice along supply chains; (b) utilising lower-ranked universities to help disseminate the innovations from top-ranked ones; (c) extending mentoring schemes for companies; (d) setting up a Steinbeis-type system.

Summing up

To sum up, one can conceptualise HRM as having a distinct multi-dimensional nature. It is an intangible resource, a technology associated with non-protected codified knowledge and tacit knowledge, and a network good. Its distinct multi-dimensional nature helps to explain why innovative HRM practices can deliver higher productivity on average, and yet at the same time, only a portion of all workplaces/firms (according to size, age, industry or region) are able, or have the incentive, to adopt these practices. The empirical analysis we present below tests hypotheses regarding HRM diffusion with workplace-level data.

3. Data and methods

Introduction

In this chapter, we introduce our data sources and discuss our methodological approach. We first describe our workplace surveys (WERS and REPONSE). We then discuss how we measure HRM in these surveys, before going on to discuss the three strands of our empirical analysis.

Data sources

Our data are taken from the British Workplace Employment Relations Survey 2011 (WERS) (Department for Business Innovation and Skills, 2018) and the French Enquête Relations Professionnelles et Négociations D'Entreprise 2011 (REPONSE) (DARES, 2013). The surveys are not explicitly harmonised, but they have been developed in parallel and contain over 100 comparable data items. They have the advantage of covering both the manufacturing and service sectors in each country.[13] They also provide larger nationally-representative samples for Britain and France than other prominent harmonised cross-national surveys (notably the European Company Survey). Such workplace data have the advantage over firm-level data in being able to take account of heterogeneity in managerial practice across workplaces belonging to the same firm.

Our analysis can call upon equivalently-defined samples of 3,947 workplaces from REPONSE 2011 and 1,602 workplaces from WERS 2011. These harmonised workplace samples are drawn from the universe of all private sector workplaces with 11 or more employees, across all industries from NACE Rev. 2 Sections C-S. All analyses apply workplace-level sampling weights to account for the use of variable probability samples in the design of WERS and REPONSE. This ensures that all estimates are representative, in each country, of all private sector workplaces with 11 or more employees. In 2011, this population accounted for almost three quarters of all private sector employment in each of the two economies.

Measuring HRM

Our measure of HRM builds directly on the categorisation of management practices set out in the discussion around Table 1. We thus focus on a set of 12 practices, each coded as dummy variables indicating their presence/absence within each workplace:

- Employee incentives and performance evaluation: Performance appraisals for non-managerial employees; Any individual performance-related pay (merit pay or payment-by-results); Any profit-sharing; Any share-ownership scheme.

[13] This is potentially important, since ONS (2017a: Figure 4) show that regional differences in firm productivity within manufacturing are relatively small. Instead, the major differences in firm-level productivity across regions of the UK occur in sectors such as professional, scientific and technical activities.

- Work organization and ICT: Use of team-working arrangements where team members jointly decide how work is to be done; Use of problem-solving groups or quality circles; Just-in-time methods of production or service delivery; intensive use of ICT.
- Workplace performance targets: Whether targets are set for: Volume of goods produced/services delivered; Total costs; Profits/return on investment; Quality of product or service.

Our categorisation bears many similarities to the list of index of 18 management practices which features in the work of Bloom et al (2017). Both measurement approaches seek to capture HR practices in the area of employee performance evaluation and performance-related reward, along with the use of problem-solving methods, just-in-time methods and workplace performance targets. Bloom et al's index also extends into organisational performance monitoring (i.e. information collection and analysis), but this aspect of management practice is not covered in REPONSE (and only partially in WERS). Instead, our index extends into the use of team-working, which has featured prominently in the HRM-performance literature, and the use of ICT, which has typically been viewed as complementary to innovative work practices (e.g. Black and Lynch, 2001; Bloom et al, 2012).

Measuring use of employee incentives and performance evaluation

In WERS we measure the use of performance-related pay through the use of either merit pay (where employees receive a payment based on a subjective assessment by their supervisor) or individual-level payment-by-results (where pay is objectively determined by the employees' performance or output). In REPONSE, we use a question identifying the payment of "bonuses related to individual performance". The practice is more prevalent in France, and considerably so, with individual PRP being used by three-fifths (61 per cent) of workplaces in France but less than two-fifths (37 per cent) in Britain. Our finding that individual PRP is considerably more common in France is consistent with earlier research (Lorenz et al., 2004).

To capture the use of performance appraisals, REPONSE identifies workplaces in which non-managerial employees regularly meet with their line manager for the purposes of evaluation and assessment and to discuss prospects. WERS has a somewhat narrower formulation, asking whether non-managerial employees have their performance formally appraised. Given this difference, and in view of the institutional context referred to above, one might expect the incidence of appraisals to be higher in France but, in fact, it is very similar. In either country, an overwhelming majority of workplaces (around 80 per cent) conduct individual evaluations. The principal difference is that workplaces in France are more likely than those in Britain to link the outcome of the appraisal to pay, whereas workplaces in Britain are more likely than those in France to link the outcome to training provision. The latter result is somewhat surprising in view of the system of training accounts in France (droit individuel de formation), but perhaps reflects the fact that they are not extensively used. The former result seems wholly consistent, however, with the more extensive use of individual performance pay in French workplaces.

We capture the use of profit-sharing by using questions in each survey which identify the presence of strict profit-sharing schemes and the provision of collective bonuses associated with performance at the workplace or firm level; either are permitted in our measure. In REPONSE, this covers mandatory profit-sharing schemes (intéressement) as well as optional schemes. We find that just over half (54 per cent) of private sector workplaces with 11 or more employees in France have some form of profit-sharing scheme, compared with 46 per cent in Britain. Notably, some schemes are mandatory for firms with 50 or more workers in France and most industry-level agreements including a provision for profit-sharing. In Britain, however, state support for profit-sharing has waned somewhat and tax advantages are now focused

around the use of share ownership arrangements. The gap between the two countries is largely apparent among workplaces belonging to medium-sized and large firms, with the incidence of such schemes being similar among workplaces belonging to small firms. Among workplaces in firms with less than 50 employees, profit sharing is used in 37 per cent of workplaces in Britain and 42 per cent in France. However, among workplaces in larger firms, the figures are 58 per cent and 83 per cent respectively, suggesting a strong effect of the particular institutional framework in France.[14]

To measure the use of employee share ownership, we use a WERS question which asks whether any of the employees at the workplace can join a Share Incentive Plan, Save as You Earn scheme, Enterprise Management Incentive scheme, Company Share Option Plan or other employee share scheme.[15] From REPONSE, we use questions which asked whether employees own shares in the firm or have stock options. Britain and France are among those countries in Europe where use of employee share plans by large listed companies is most extensive (Mattieu, 2014). Our data indicate that the use of share schemes at workplace level is similar in the two countries, with just under one fifth of workplaces in either country having share plans (17 per cent in Britain and 18 per cent in France).

Measuring work organisation and the use of ICT

To construct an indicator of the use of autonomous work teams, we use a question from REPONSE which asks whether the workplace has any employees in “autonomous production teams”, whilst from WERS, we identify workplaces in which some members of the largest occupational group work in teams that “jointly decide how work is to be done” and which also “have responsibility for specific products or services”.[16] To identify the use of problem-solving groups, we use the REPONSE question asking whether the establishment has any “quality circles or problem-solving groups” and the WERS question asking whether the establishment has “groups of non-managerial employees that solve specific problems or discuss aspects of performance or quality, sometimes known as problem-solving groups or continuous improvement groups". To identify the use of just-in-time (JIT) methods, we use the WERS question asking whether the workplace operates “a system designed to minimise inventories, supplies or work-in-progress, sometimes known as Just-in-Time”. In REPONSE, we combine two separate questions on the use of “just-in-time with suppliers” and “just-in-time with customers”.

Each of these three practices is more prevalent among workplaces in France, with the difference being most striking in respect of the use of problem-solving groups. In France, around two-fifths (42 per cent) of workplaces in our population make use of such groups, compared with just one-fifth (18 per cent) in Britain. The gap is closer in respect of the use of JIT methods (used in 36 per cent of workplaces in France and 26 per cent in Britain), and closer still in respect of team working (49 per cent and 44 per cent respectively), but in each case the difference in prevalence between Britain and France is statistically significant at the five per cent level.

The use of advanced technology has been ignored in large parts of the literature on HRM practices, but has been a prominent consideration in debates about national productivity

[14] This does not necessarily indicate non-compliance among large firms in France, as some may have no profits to share.
[15] The first four types of scheme all offer specific tax advantages in Britain.
[16] Although the WERS questions are restricted to the largest occupational group, we would expect that, when autonomous production teams are indicated in REPONSE, they are used by at least some core workers at the establishment.

performance (Van Ark et al., 2008). Unfortunately, the 2011 WERS and REPONSE questionnaires have no directly comparable questions of the use of ICT and so we are unable to construct a closely-matched indicator in this domain. In order to obtain a measure of ICT use within our investigation, we therefore rely on different questions and seek to identify those workplaces that are intensive users on the dimension covered in the respective questionnaires. In WERS, we identify 'intensive users' as those where at least 90 per cent of the workers use computers. In France, we focus on workplaces that use Enterprise Resource Planning (ERP) – business management software that can be used to collect, store, manage and interpret data from a range of business activities. Our rationale, in terms of comparability, is that EPR systems typically involve a suite of integrated applications and require engagement from a large proportion of the workforce. Using these indicators, around one third (32 per cent) of private sector establishments with 11 or more employee are 'ICT intensive' in France, compared with just under half (45 per cent) in Britain. [17]

Measuring workplace performance targets

In both WERS and REPONSE, the workplace manager is asked whether the workplace has targets ("specified and quantifiable targets" in REPONSE) across a number of different domains. The full list of items on which targets may have been set for the workplace is not identical, but three items are very closely comparable: profitability, total costs and quality. An item on sales volumes is slightly less comparable ("Volume of sales" in WERS, and "Growth, market share" – thus potentially relative to competitors – in REPONSE). Looking across all four items, we find that the share of workplaces with profit targets is quite similar in the two countries (60 per cent in Britain and 63 per cent in France), but there are differences in the magnitude of the other three items. Targets for total costs are more common in France (80 per cent versus 58 per cent), as are targets for quality (80 per cent versus 51 per cent), whereas targets for sales are more common in Britain (71 per cent versus 53 per cent).

The overall index vs sub-indices

Principal components analysis of the twelve practices confirms that the practices form three coherent groupings. In a first run, two distinct blocks emerge in either country, with the four main target-setting measures sitting together, but apart from the incentive and work organisation practices.[18] When a further principal components analysis is then conducted on those practices alone, a distinction is apparent (again in each country) between the four practices relating to incentives and the four relating to work organisation and ICT.[19]

Much of our analysis focuses on an overall index which counts the number of practices in use at the workplace (an index running from 0-12). However, we do examine variations in diffusion across the three groupings descriptively. We have used these measures productively in previous comparative research on Britain and France (Askenazy and Forth, 2015), with a close-variant also being used in recent work looking at the links between management and SME performance in Britain (Forth and Bryson, 2018). Our index places greater emphasis on people management practices than those used by Bloom et al (2017) or ONS (2017b, 2018c). However, efforts to break up those indices to look at the relative contribution of practices in

[17] These figures are not inconsistent with the European working conditions survey 2010: the proportion of permanent workers using computers almost all of the time was 39 per cent in France compared 46 per cent in the UK.
[18] Detailed results are available on request.
[19] The exception is that, in France, share ownership sits more with the work organisation and ICT grouping than with the other incentive practices.

each of the different domains indicate that people-management practices tend to be the most influential drivers of productivity - see ONS (2017b: Table 6), ONS (2018c: Table 6) and Broszeit et al (2016: Table 4) for example.[20]

Methods

Exploring the intensity of HRM in Britain and France

We first undertake descriptive analysis to explore the intensity of HRM in Britain and France. This is a workplace-level analysis using the HRM index described above, in which we examine mean levels of HRM intensity in each country but also examine the degree of dispersion within each country. Some descriptive statistics are also shown to indicate differences or similarities between the two countries on each of the three sub-indices of the overall index. This analysis relies solely on the WERS and REPONSE data. The results are presented in Chapter 4.

Assessing the spatial correlation between HRM and productivity

In order to examine spatial variation in HRM intensity within each country, we derive aggregate estimates of HRM intensity for each region in either country. This is done first at NUTS1 level, but also at NUTS2 and NUTS3 level to give greater detail. For WERS, we are able to use information on the postcode location of each workplace – provided on the 'Secure Access' version of the WERS data available through the UK Data Service's Secure Lab – to locate each workplace within its relevant NUTS region, using the National Statistics Postcode Directory (ONS, 2016a). For REPONSE, we use information contained within the dataset which classifies each workplace to its département.[21]

We use the resulting region-level estimates to explore the spatial correlation between HRM and productivity. Productivity is measured by taking GDP at purchasing power standards and dividing by a workplace-based measure of the number of persons employed in the region, following the approach used by ONS (2018b). The data are taken from Eurostat's regional accounts, again at varying NUTS levels (Eurostat, 2018a). The results are presented in Chapter 5.

Exploring workplace-level variance in HRM

In order to explore the possible determinants of spatial variance in HRM intensity, and to explain variance in HRM more broadly, we finally turn back to a workplace-level analysis. The focus is on the use of ordinary least squares (OLS) regressions, whereby the intensity of HRM at a given workplace is explained through reference to the various characteristics of the workplace, its parent firm and the product and labour markets in which the workplace is operating. The results of this analysis are presented in Chapter 6.

Most of the data items that we employ in this analysis are contained within the WERS and REPONSE datasets. However, our interest in spatial and network determinants of HRM intensity leads us to extend the data along a number of dimensions, outlined below.

[20] Also see Birdi et al (2008).
[21] We do not have access to postcodes for workplaces in REPONSE.

Distance from frontier region

Following the 'hub and no spokes' thesis outlined in Chapter 2, we hypothesise that distance from the 'frontier region' will affect HRM intensity to a greater extent in Britain than in France. We take the 'frontier region' to be either the region with the highest level of productivity (the capital city in either case) or the NUTS3 region with the highest level of HRM intensity (London and Loir-et-Cher).

We first use a look-up file, produced by Eurostat, which specifies the distance between NUTS geographical regions within each country in the EU (Eurostat, 2018b). This enables us to code the geographical distance (in km) between each workplace's NUTS3 region and the region at the productivity/HRM frontier. Travel times would be preferred as a measure, but these are not readily available in public datasets; however, we have compiled such data for France and we use this to run a sensitivity check with the REPONSE data. [22]

For WERS, we are then able to replace our NUTS-based distance measure with one based on middle-layer super output areas (MSOAs); these are smaller than NUTS3 areas, on average, and so we are able to obtain a more precise measure of distance to the capital through this route.[23] We use the WERS postcode to assign each workplace to its MSOA, and then use data on the easting and northing of the population-weighted MSOA centroid (ONS, 2016b; Scottish Government, 2018) to compute the distance to the City of London MSOA.

Spatial concentration of activity

Following the discussion of agglomeration economies in Chapter 2, we hypothesise that workplaces in areas that have a higher concentration of businesses will have higher levels of HRM intensity, because of the greater opportunities for network-based knowledge sharing about 'best practice'. However, following our earlier discussion of Gordon and McCann (2000: 516-8), we also acknowledge the possibility that, in spatially concentrated areas, the greater availability of agglomeration economies may, alternatively, weaken the incentive to improve the workplace's own HRM practices, since productivity advantages can be secured through other means. We proxy the spatial concentration of activity at local level via employment density (employed persons (thousands) per square km), measured at the NUTS3 level using Eurostat's regional demographic statistics (Eurostat, 2019).

Local skills supply

We measure local skills supply around the WERS workplace using data from the 2011 Annual Population Survey (ONS Social Survey Division, 2018). We focus on skills supply on two dimensions: first, the local supply of skilled managers and supervisors; and second, the local supply of skilled non-supervisory employees. We identify managers and supervisors as all those employees in Major Groups 1 and 2 of the Standard Occupational Classification (2010). Non-supervisory employees are taken as all those in Major Groups 3-9. Skill levels are proxied by degree-level educational attainment.

Accordingly, we estimate the local supply of 'skilled managers and supervisors' by computing the share of all employees in SOC1 or SOC2 who hold a degree-level qualification in business

[22] We mix two sources, keeping the shorter route. First the train travel times from the station of the main city (in general the Prefecture) in each NUTS3 to a station in central Paris: the oui.sncf database (February 2019) is corrected for the construction of new high-speed lines between 2011 and 2019. Second, adp.fr provides flight schedules from/to Orly airport (nearest Paris airport, 12 km south) to/from the local airport; we keep only regular commercial lines with connections at business times all year long; 2 hours are added to the flying time.

[23] MSOAs have an average population of around 7,000 persons. Strictly, MSOAs only cover England and Wales. In Scotland, we use Intermediate Zones. The term MSOA is used as a collective shorthand in the text.

administration (covering general business degrees, finance degrees and so on, whether at undergraduate or post-graduate level, i.e. MBAs). We also compute the share with a non-business degree to test whether there may be returns from a local supply of managers and supervisors who have been trained in other subjects (e.g. law, engineering).

We estimate the local supply of 'skilled non-supervisory employees' by computing the share of all employees in SOC3-SOC9 who hold a degree-level qualification, again distinguishing between business and non-business degrees.

These estimates of local skills supply are computed for each local education authority (LEA), this being the only disaggregated geographical identifier present on the APS which could reasonably facilitate matching to WERS.

Networks

Our WERS and REPONSE data provide indicators of workplace managers' membership of employer networks (e.g. employers' associations or trade associations). However, following the discussion in Chapter 2, we expect that knowledge about management best practice may also flow along production networks (supply chains). To capture this potential mechanism, we identify the two-digit industry to which each WERS workplace belongs, and then use this in conjunction with the 'Intermediate consumption' matrix in ONS' Supply-Use Tables for 2011 to compute an HRM intensity score for the industry's upstream and downstream supply chain.

The upstream intensity score is computed as the weighted average of the HRM scores for each two-digit industry which supplies goods or services to the industry of the sampled workplace, with the weights equal to each industry's share of the total supply by value. The downstream score is the weighted average of the HRM scores in the industries which buy goods or services from the industry of the sampled workplace, with the weights computed in an equivalent way.

To capture network effects which may operate within the workplace's own industry sector, we compute the HRM score for all other workplaces in that industry sector (leaving out the sampled workplace from the calculation).

These additional measures are included in further analyses presented in Chapter 6.

4. The extent of HRM in Britain and France

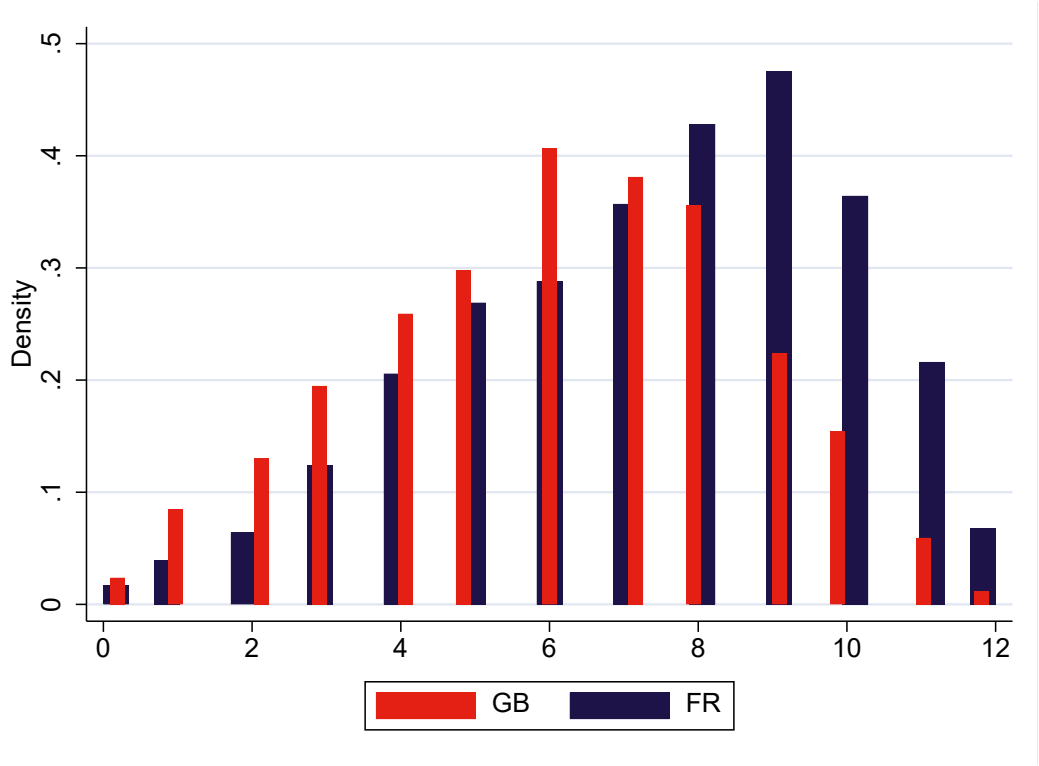
Introduction

In this chapter, we present descriptive evidence on the incidence of HRM across workplaces in Britain and France. The focus is on the overall extent of use of HRM in the two countries. Variations by region and other characteristics are explored in Chapters 5 and 6.

Workplace-level variance in HRM and related practices

In order to describe the variance in HRM intensity at workplace level, we focus on the overall HRM index (ranging from 0 to 12). Figure 1 below shows a simple histogram of the intensity of use of these 12 practices in Britain (the red bars) and France (the blue bars). The mean number of practices in use across our private sector workplace sample is 5.5 in Britain and 6.4 in France (the median values are 6 and 7 practices respectively). Workplaces in France thus utilise a greater number of these practices on average. The variance across workplaces is similar within each country however; the inter-quartile range in each country is seven points and the population standard deviations are not substantially different from one another (2.5 for Britain, 2.6 for France).

Figure 1: Distribution of HRM and related practices across workplaces, Britain and France



Source: WERS and REPONSE (2011)

The aggregate differences in HRM intensity, as shown in Figure 1, are not driven by gaps on any one dimension of the overall index. Although there are differences in the incidence of individual practices across the two countries (see Chapter 3), once these practices have been

grouped into the three broad domains of 'Employee incentives and performance evaluation', 'Work organisation and ICT' and Workplace performance targets', France has a higher mean score on all three sub-indices (Table 2). The differential is proportionately greatest in respect of the 'work organisation and ICT' domain, where the score for France is around 25 per cent higher than the score for Britain, but the absolute difference in scores between the two countries is identical on all three measures.

Table 2: Intensity of HRM and related practices across three domains, Britain and France

	Britain		**France**	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**
HRM intensity index	5.5	2.5	6.4	2.6
Sub-components:				
Employee incentives and performance-evaluation	1.8	1.1	2.1	1.1
Work organization and ICT	1.3	1.0	1.6	1.1
Workplace performance targets	2.4	2.5	2.7	2.9

Source: WERS and REPONSE (2011)

As one might expect, the three scales are each significantly and positively correlated with one another in both countries. The correlation is particularly high between targets and incentives (0.35 in both countries). It is next highest between incentives and work organisation (0.28 in France and 0.23 in Britain), followed by work organisation and targets (0.24 in France and 0.19 in Britain). These correlation coefficients indicate that French workplaces not only have higher scores on each of the scales, but also that they are more likely to combine the practices across the three domains. If we construct an indicator which identifies workplaces that are above the median on each of the three domains, using the same threshold in each country, we find that the proportion of workplaces that are below the median on all three domains is 37 per cent in Britain, compared with 26 per cent in France. Conversely, 15 per cent establishments are above the median on all three domains in France, compared with 9 per cent in Britain.

Summary

Focusing on the overall extent of use of HRM in the two countries, we see that there is a higher level of HRM intensity, on average, across workplaces in France than in Britain. The gap is not restricted to any one domain of HRM, however; instead, it appears to be pervasive. Chapter 5 goes on to examine how this aggregate picture develops when one looks below the national level at regional variance within and across the two countries. Chapter 6 then takes this one step further to explore workplace-level variance in either country.

5. Spatial variation in HRM and productivity

Introduction

A core motivation for our study was to explore the extent of spatial variance in management practices and to assess its potential contribution to regional imbalances in productivity in Britain. In this chapter we begin to address this issue by examining the extent of regional variance in HRM intensity in both Britain and France and investigating the extent to which this regional variance is associated with regional productivity imbalances.

As noted in Chapter 1, spatial productivity differentials partially reflect differences in natural resource endowments, history and culture. However, they are also likely to reflect variations in the internal investments that are made within organisations: investments in capital, skills and other productivity-enhancing factors of production. Our contention is that management is one such factor.

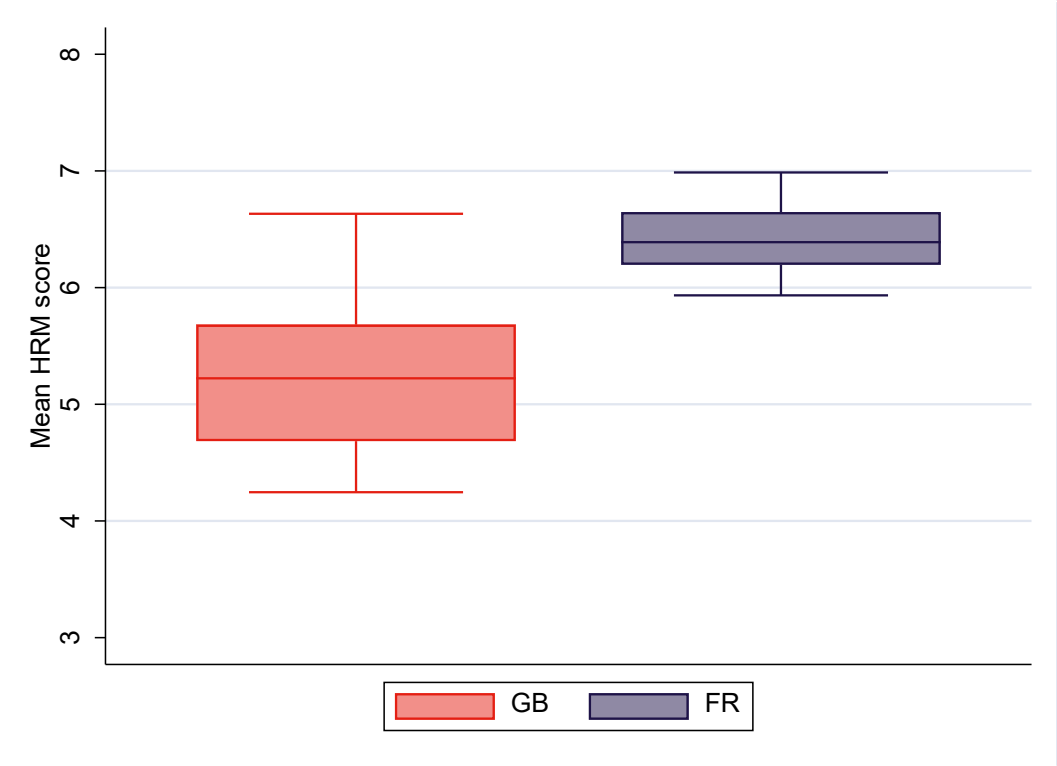
If a correlation is then observable at regional level between HRM intensity and levels of labour productivity, this may indicate some role for HRM diffusion in contributing to regional imbalances.

Spatial variation in HRM

Taking a spatial perspective and examining the dispersion of workplace means across high-level regions, we actually find that the spatial variance is much smaller in France. To explore spatial variation across high-level regions, we adopt the NUTS1 classification for Britain but sub-divide the eight mainland NUTS1 regions of France into 12 regions, to ensure that we have a set of regions that are broadly similar in size. [24] Figure 2 shows a box-and-whisker plot of the dispersion of ‘mean regional HRM intensity’ across these regions within each country. The overall distribution is clearly narrower across the French regions.

[24] The Ile de France NUTS1 region in France is otherwise particularly large relative to other regions in our data, for example.

Figure 2: Dispersion of HRM intensity by (approximate) NUTS1 region



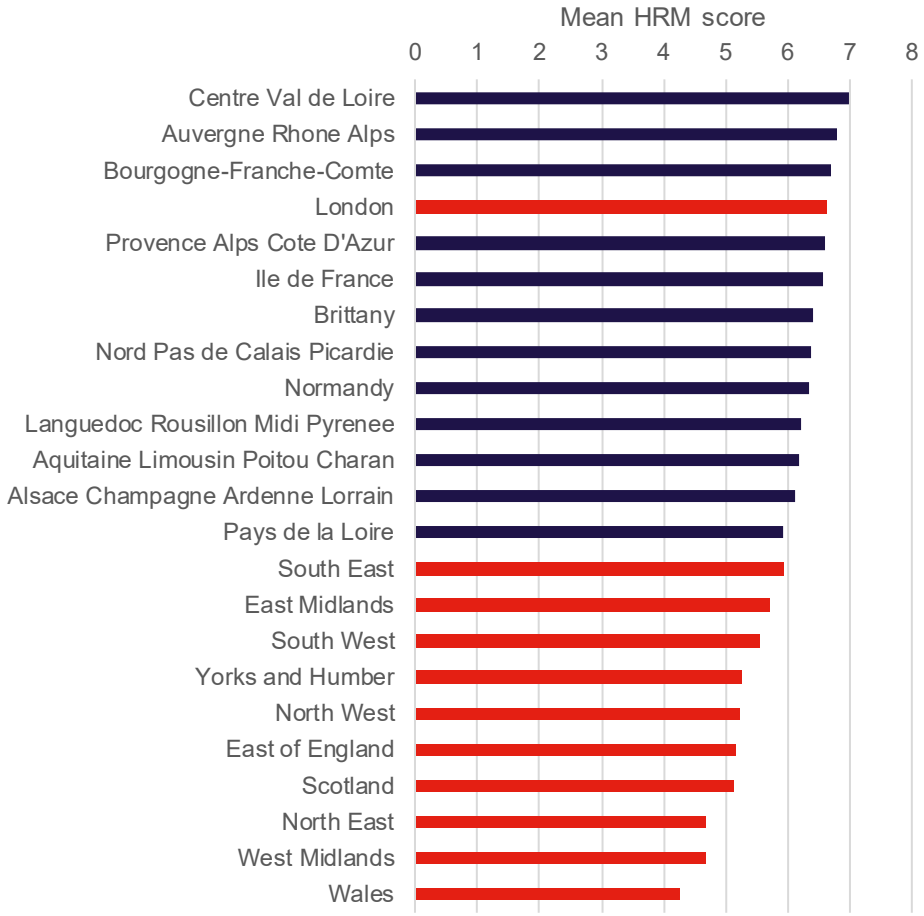
Source: WERS and REPONSE (2011)

Notes: The lower edge of each box identifies the 25th percentile, and the upper edge the 75th percentile, with the central line indicating the median value for the country. The whiskers identify the 'adjacent values'.

Figure 3 explores this variance in more detail by ranking all 23 regions according to their mean HRM score. London is the only British region in which mean HRM intensity reaches the levels seen in France. In fact, the two capital cities (London and Paris – Ile de France) have almost identical HRM scores.[25] Looking more broadly, the graph shows less dispersion in HRM across regions in France, with the highest-scoring region being only one point ahead of the lowest-scoring region. In contrast, the range in Britain is at least two full points. The implication from both Figure 2 and Figure 3, then, is that Britain's lower aggregate score is driven in large part by a tail of peripheral regions in which average HRM intensity is notably weak.

[25] The mean scores for London and Ile de France are identical to one decimal place on the overall index, as well as on each of the three sub-indices. The percentage of workplaces scoring above the median on all three sub-indices is also identical (16 per cent in both cities).

Figure 3: Ranking of (approximate) NUTS1 regions by HRM intensity



Source: WERS and REPONSE (2011)

The greater degree of heterogeneity in HRM across regions in Britain is further indicated in Table 3 below. The table clearly shows that, at each level of regional disaggregation, the dispersion in HRM intensity across regional areas is greater in Britain than in France. The coefficient of variation (the ratio of the standard deviation to the mean) is typically twice as large in Britain, ranging from 0.12 to 0.29 compared with values of 0.05 to 0.13 in France.

Table 3: Intensity of HRM at different levels of regional disaggregation, Britain and France

NUTS3	Britain			France		
	Mean	Std. Dev.	Number of regions	Mean	Std. Dev.	Number of regions
NUTS1	5.30	0.65	11	6.43	0.30	12
NUTS2	5.26	0.88	39	6.49	0.44	30
NUTS3	5.38	1.56	167	6.42	0.83	94

Source: WERS and REPONSE (2011)

Note: As noted in the text, the 8 official, mainland NUTS1 regions of France are here sub-divided into 12 regions. Similarly, the 21 NUTS2 regions are subdivided into 30.

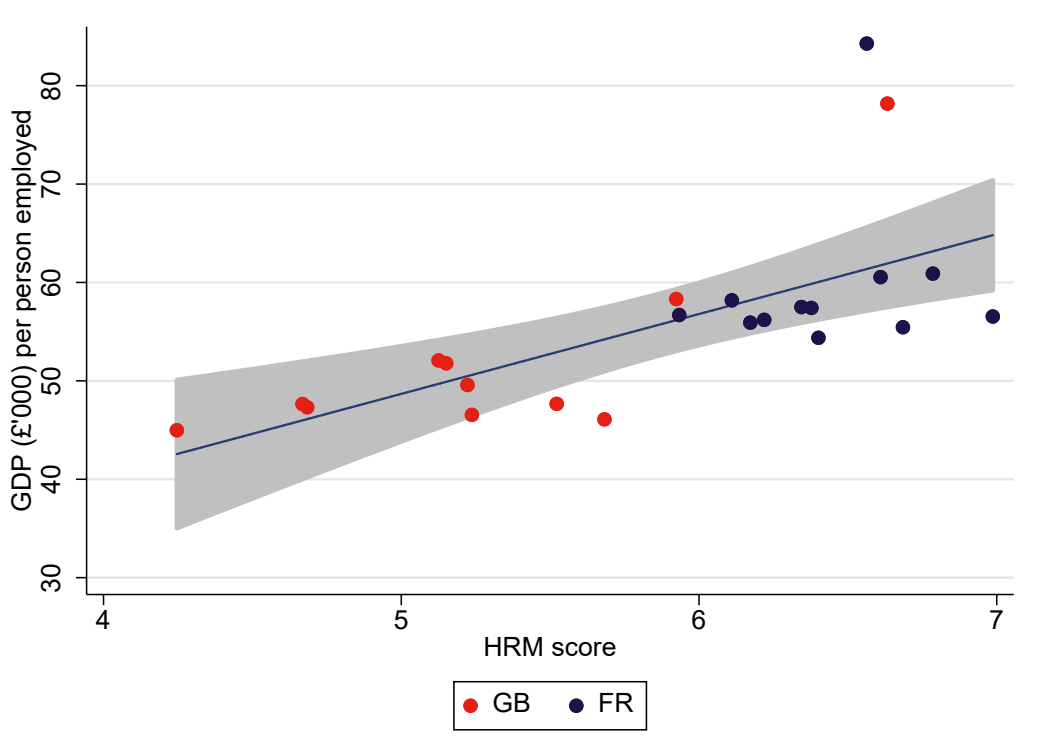
HRM and productivity at regional level

The ranking of regions in Figure 3 bears a number of similarities to the equivalent ranking of Britain and France's NUTS1 regions on the basis of their labour productivity, provided by ONS (2018: Figure 1). In the productivity ranking, the regions of France generally appear higher in the table than the regions of Britain, with only London and the South East breaking into the French group. Similarly, Wales and the North East sit towards the bottom of the regional productivity ranking, just as they do in our ranking of HRM intensity.

We thus explore this association explicitly in a correlation analysis of HRM intensity and productivity at regional level. Regional HRM intensity is as depicted in Figure 3. To measure regional productivity, we use data from Eurostat's regional economic accounts. We follow the ONS (2018b) in taking GDP at purchasing power standards and dividing by a workplace-based measure of the number of persons employed in the region to arrive at comparable measures of regional productivity for the two countries.

An examination of the data indicates that there is a strong cross-sectional correlation between the use of HRM practices and labour productivity at the NUTS1 regional level (Figure 4).

Figure 4: Scatterplot showing correlation between HRM Intensity and Labour Productivity across 23 Regions of Britain and France, 2011, plus line of best fit



Source: WERS and REPONSE (2011); Eurostat (2019)

Notes:

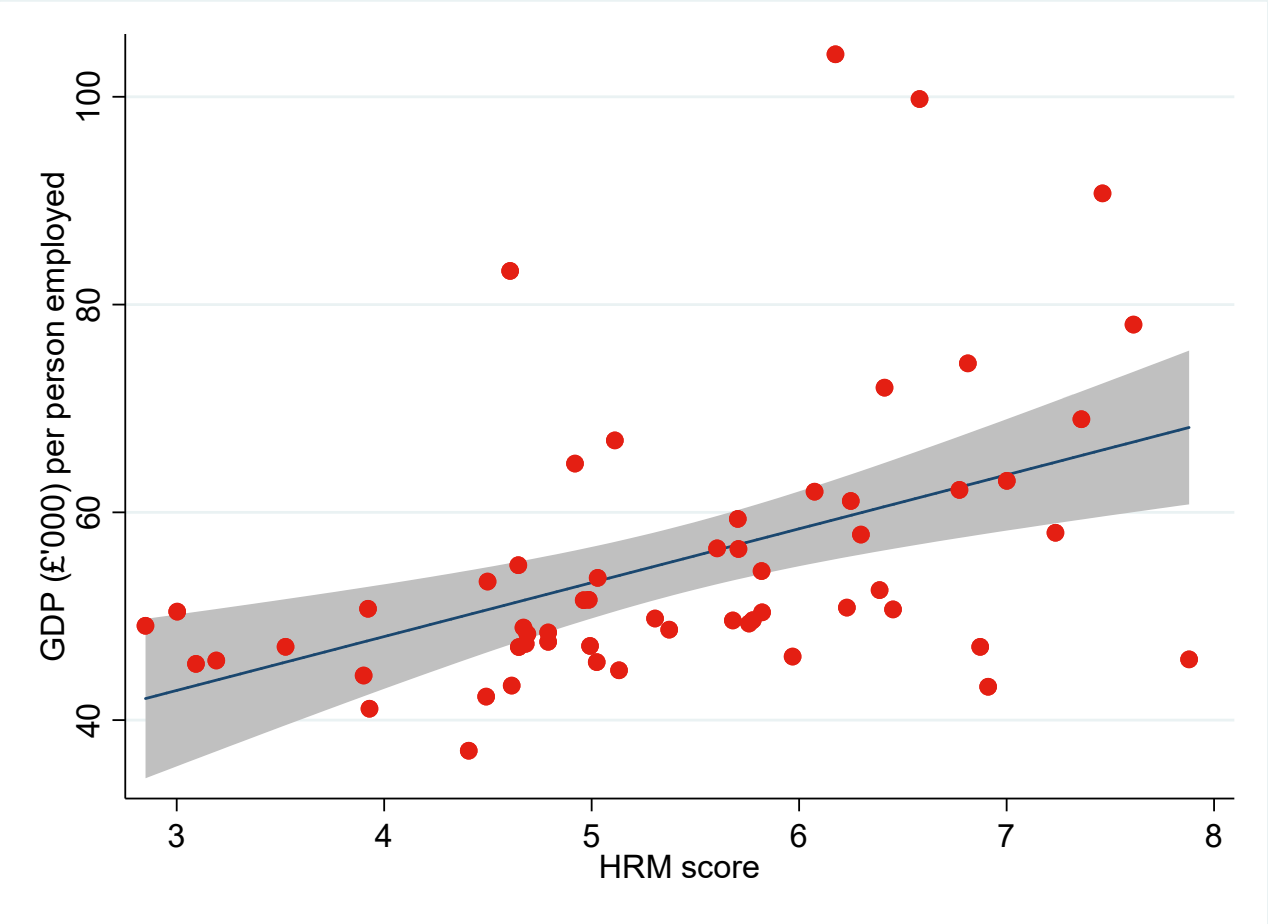
- Each point on the scatterplot represents a single region (approx. NUTS1)
- GDP per person for Britain and France is adjusted for purchasing power parity, taking data from Eurostat's Regional Economic Accounts, and following the approach taken by ONS (2018b)
- The HRM score is derived from plant-level data for private sector establishments with 20+ employees in the 2011 REPONSE and WERS surveys, based on an index measure of HRM practices originally used in Askenazy and Forth (2015).
- The shaded area indicates the 95 per cent confidence interval around the line of best fit

We extend the analysis to a sub-regional level by using our workplace data to derive HRM intensity scores for NUTS2 and NUTS3 regions, which can then be correlated with productivity estimates for these lower-level aggregates, taken from Eurostat's regional accounts. Again, we adopt the strict NUTS classification for Britain, but we sub-divide the 21 mainland NUTS2 regions of France into 30 regions, to ensure that we have a set of regions that are broadly similar in size to the NUTS2 regions of the UK. We do not make any revisions to the NUTS3 classification in either country but, at this level, we test the sensitivity of our results to the exclusion of NUTS3 regions that are sparsely represented in our WERS and REPONSE data (using a cut-off of 10 observations).

Figure 5 shows the correlation between HRM intensity and regional productivity at NUTS3 level in Britain and France. Table 4 then shows the results of robust regressions of regional productivity on regional HRM intensity for varying samples (approximate NUTS1, approximate NUTS2, and NUTS3). In Britain, there is a positive correlation between HRM intensity and regional productivity at all three levels of aggregation. At NUTS3 level, a one-unit increase in the HRM score is associated with a labour productivity increase of around £3,500 per person employed.[26] In France, the correlation is statistically significant at NUTS3 level, but the elasticity is weaker than that seen in Britain (implying an increase in labour productivity of around £1,400 per person employed for each additional point on the HRM intensity scale).

Figure 5: Scatterplot showing correlation between HRM Intensity and Labour Productivity across NUTS3 regions of Britain, 2011, plus line of best fit

Britain



Notes:

- Each point on the scatterplot represents a single NUTS3 region after omitting all regions with HRM scores based on fewer than 10 observations
- For other notes and sources, see Figure 4

[26] Here, we cite figures based on all regions with at least 10 observations from WERS. Regions with less than 10 observations are omitted as the HRM intensity score will be measured imprecisely. Indeed, the GB coefficient in column 3 appears downwardly biased in comparison with the other specifications.

Table 4: Regressing regional labour productivity on HRM intensity at differing levels of regional aggregation in Britain and France

	Approx. NUTS1	Approx. NUTS2	NUTS3	NUTS3^
Britain:				
HRM intensity	4.291 *	3.587 ***	0.991 ***	3.540 ***
	[1.75]	[2.87]	[2.77]	[4.20]
Observations	10	39	167	58
F-test	3.08	8.24	7.67	17.65
Prob > F	0.118	0.007	0.006	0.000
France:				
HRM intensity	1.384	1.460	1.374**	1.418*
	[0.58]	[0.96]	[2.01]	[1.91]
Observations	12	30	94	85
F-test	0.34	0.92	4.04	3.64
Prob>F	0.572	0.345	0.047	0.060

Sources: See Figure 5.

Notes:

- ^ omits any region with fewer than 10 observations in WERS or REPONSE.
- Models estimated via robust regression to account for outlying values.
- T-statistics in parentheses.

Summary

To explore the extent of spatial variance in management practices and to assess its potential contribution to regional imbalances in productivity, this chapter examines the extent of regional variance in HRM intensity in both Britain and France and investigates the extent to which this regional variance is associated with regional productivity imbalances.

We find that there is considerable variance in HRM intensity across regions and that the ranking of regions on this basis bears striking similarities to an equivalent ranking of regions' labour productivity. Exploring the correlation between the two series, we find that there is a positive and statistically significant correlation between HRM intensity and labour productivity at varying levels of regional disaggregation in Britain. A similar correlation exists in France, although it is generally weaker. This may indicate some role for HRM diffusion in contributing to regional imbalances, particularly in Britain.

It goes without saying that there are many other important factors to be considered in explaining regional productivity differentials: see Rice et al (2006), Webber et al (2009), CBI (2016) and Gal and Egeland (2018), among others, for some discussion of these factors, which include capital investment, skills, institutions and so on. However, the analysis presented in this chapter is, to our knowledge, the first to show a clear correlation between management practice and productivity at regional and sub-regional level in Britain. The results are some considerable way from providing estimates of the independent association between regional management practice and regional productivity, and even further from identifying a causal link between the two. However, when placed alongside the growing evidence that management practices positively (and causally) affect productivity at firm level, the analysis presented here appears suggestive that management may play some substantive role in contributing to regional productivity differentials.

The next chapter returns to the question of why such variance in management practices might exist. To answer this question, the analysis moves back to the workplace level to investigate why some workplaces have higher levels of HRM intensity than others.

6. Analysis of workplace-level variance in HRM

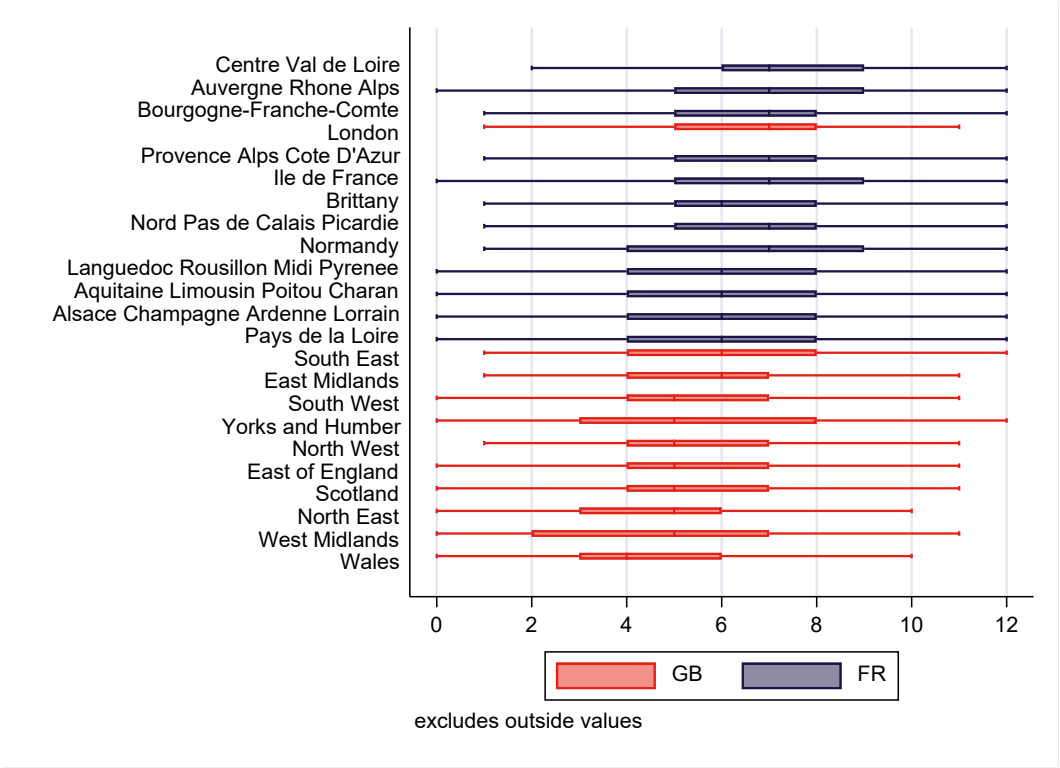
Introduction

In the previous chapter, we showed that HRM intensity varies across regions in both Britain and France. In this chapter we switch to a workplace-level analysis to assess the degree to which HRM intensity varies, not only across regions, but within regions. Such an analysis helps to answer the question of why some workplaces (and by extension, regions) have higher levels of HRM intensity than others.

Figure 6 shows HRM dispersion across and within NUTS1 regions in Britain and France. The thick parts of each line indicate the interquartile range around the median HRM score for the region. As seen in Figure 2, French regions have higher average levels of HRM intensity than UK regions, with the exception of London which is fourth in the rankings. But Figure 6 is striking in showing the within-region dispersion in HRM, something that is apparent for all regions. In most cases workplaces span at least 10 points of the index, with the interquartile range in most regions spanning around four points.

It is clear from the figure that there is a great deal of within-region HRM dispersion to explain. The next section draws on the discussion in Chapter 2 in identifying reasons as to why HRM intensity might vary across workplaces, before going on to establish whether this across-workplace variance in HRM can fully account for variance in HRM across regions. Our evidence indicates that workplace composition accounts for some, but not all, of the across-region variance in HRM intensity. The implications of these findings are discussed with particular reference to factors that may inhibit or facilitate HRM diffusion.

Figure 6: Dispersion of HRM intensity by (approximate) NUTS1 region, Britain and France



Source: WERS and REPONSE

Hypotheses

In Chapter 2 we argued HRM can be conceived of as a management technology, that is, a factor in production, and that its deployment can improve productive efficiency. The costs and benefits of HRM may be heterogeneous across workplaces, depending on the nature of their production processes and the markets they operate in. Thus, the optimal HRM intensity might vary from workplace to workplace. At the same time, employers may be unable to reach their optimal level of HRM, perhaps because they have insufficient information about what that level is, or because they face substantial constraints in seeking to adopt HRM practices which prevent HRM diffusion. We outline some hypotheses below then test them with our workplace-level data for Britain and France.

Size: We hypothesise that large workplaces, and those that belong to multi-site firms, will have higher levels of HRM intensity than smaller workplaces and single-site firms. There are various reasons to suppose this might be the case. First, HRM adoption and maintenance entails fixed costs which are more easily accommodated in larger organizations: those costs can be shared across many employees and multiple sites generating economies of scale apparent for other investments in capital equipment or physical technology. Second, if it is cheaper and easier to share knowledge within the boundaries of the firm than it is to share it across firm boundaries (e.g. with other similar employers in the local area), then a workplace belonging to a large firm is likely to have a higher HRM intensity than an equivalent-sized single, independent workplace. A third possibility, which we cannot discount, is that HRM and size may be correlated since more productive firms tend to grow, and the correlation between HRM and size may simply be picking up this underlying correlation. Our data contain the number of

employees in the workplace and whether the workplace is part of a multi-site firm so we can test for these correlations.

Internationalisation: Conditioning on size, exposure to foreign markets will be positively correlated with HRM intensity because firms operating in the international arena are exposed to influences – such as cutting-edge management practices – which may not be present in smaller, local markets. Foreign-ownership might also influence HRM adoption where firms transfer practices that have worked in the country of origin. Foreign ownership may also be associated with higher HRM intensity because foreign firms have a particularly strong incentive to seek out comparative advantages in production to compensate for the additional costs they incur by operating abroad. Our data contain information on foreign ownership and the geographical scope of the workplace's product market (local; regional; national; or international).

Product market competition: Firms have greater incentives to operate at their production frontier when they face intense product market competition. If those incentives are absent because competition is not intense, the incentives to adopt HRM may be absent. On the other hand, if the pay-offs to HRM are only likely to emerge in the long-term, firms in competitive markets may be unwilling to invest in it. Our data contain information on the extent of product market competition facing the workplace including the number of competitors and the degree of competition in the workplace's main product market.

Skills and knowledge: Managers' awareness of the best HRM practices may depend on their own levels of knowledge and skill, something we can capture in our data using the manager's title and educational attainment. Less capable managers, which might include those who have inherited family businesses and have not studied management, may be unaware of the best practices or, if they are, may lack knowledge as to how to implement them. Even where good managers do exist, HRM often relies on the complementary skills of highly qualified workers. If skilled workers are lacking this may limit managers' preparedness to adopt HRM.[27] Our data have information on the job title and academic qualifications of the senior HR manager at the workplace, and on the skill levels of the workforce more generally.

Managerial networks: Managers can learn from others outside the firm through networks, such as employer associations. They may learn about new practices or receive recommendations of which practices appear beneficial and which do not. Thus, more extensive networks can lower the costs of acquiring information about best practices and help identify similar firms from which to learn about successful implementation and likely performance benefits. We therefore hypothesise that workplaces whose managers are involved in business advisory networks, HR networks or employers' associations are likely to benefit from greater knowledge sharing opportunities.[28] Whilst such business networks naturally exist in Britain, they are not as extensive, or as strongly embedded in the institutional infrastructure as is the case in France. Our data have information on the type and number of business networks that workplace managers are involved in, covering: membership of employers' associations; and membership of trade associations/chambers of commerce.

Distance and region: The regional analysis revealed that the capital city had the highest HRM intensity score in Britain, but not in France. These findings are, on the face of it, consistent with alternative approaches to economic development. In Britain, there is evidence to suggest

[27] Existing research suggests that managerial improvements in France are more constrained by access to skills, whereas in Britain they are comparatively more constrained by a lack of information. See Bloom et al (2011).
[28] For evidence on the association between business networks and HRM diffusion in British SMEs, see Wu et al (2014). For comparative evidence, see Marsden and Belfield (2010).

a London-centric economy, where distance-from-London can affect resources and prospects. France, by contrast, has adopted a hub-based economic strategy where each region resembles a microcosmic version of the French economy. We test whether such considerations matter for the diffusion of HRM practices by calculating each workplace's distance from the capital city. We hypothesise that distance from the capital will be negatively correlated with HRM intensity in Britain, but not in France where it is possible that distance from the regional hub may matter. The distance metric used is linear distance from the capital in 100s of kilometres. In Britain we capture distance from the City of London. In France we use distance from the Ile de France.

Local area effects: There are a variety of local area characteristics that might affect HRM intensity at the workplace. First, if agglomeration economies are relevant to the diffusion of HRM, as some suggest, we might expect the spatial concentration of economic activity to be positively associated with HRM. We use population density as a proxy for firm-level density, and it may also capture the density of local networks for economic activity. We match in local area employment density data from Eurostat. We also anticipate that the availability of management skills in a local area will affect HRM intensity, in part because the availability of those skills will influence the price local employers have to pay for those skills, but also because areas with a bigger pool of managerial talent are likely to have greater knowledge of best practice HRM. We use the Annual Population Survey (APS) to derive local-area estimates of managerial skill, such as the possession of degree-level management qualifications. We also use data on the locality of those business schools which appear in the Financial Times European Ranking Tables to examine whether additional benefits accrue to workplaces that are located close to these sources of academic knowledge on best practice. We are only able to explore these associations for Britain.

Production networks: In addition to knowledge exchange via membership of employer networks (e.g. employers' associations or trade associations), information about best practice may also be shared within usual buyer-supplier relationships (in the case of 'just-in-time' production, for example, synergy of practice may be a requirement of such a relationship). We therefore hypothesise that workplaces which engage in buyer-supplier relationships with firms with high levels of HRM intensity will themselves be better managed. We have no direct indicator of these relationships, but we look for suggestive evidence of such spillovers by using the ONS Supply-Use Tables to identify those industries which are likely to feature in a given workplace's upstream and downstream supply chain and looking for an association between the HRM intensity of those industries and the HRM intensity of the sampled workplace. We look for network effects which may operate within the workplace's own industry sector by computing the HRM score for all other workplaces in that industry sector (leaving out the sampled workplace from the calculation). Again, we are only able to explore this hypothesis for Britain.

Results

Table 5 presents Ordinary Least Squares (OLS) regression analyses for workplace-level HRM intensity for Britain and France respectively. We use ordinary least squares estimation and standardise the HRM intensity count so that it has a mean of zero and a standard deviation of one in each country. The coefficients on the covariates can thus be interpreted in terms of shifts of fractions of a standard deviation within the distribution of HRM intensity for the country in question. The covariates are selected in order to explore the various hypotheses set out earlier in the chapter. Some, but not all, find support in the regression results.

Size: workplace size and organization size are both positively correlated with HRM intensity in both countries, as is being a multi-site rather than a single-site organisation. This suggests that, as firms get larger, they benefit, either from scale economies (spreading the costs of HRM investments across many employees or plants) or from sharing economies (spreading knowledge across multiple plants within the boundaries of the firm). It is difficult to untangle the two with our data, however.

Internationalisation: HRM intensity is greatest in workplaces operating in international markets, when compared to those in more local markets. This may reflect a degree of self-selection, but evidence also suggests that firms obtain productivity benefits from operating in larger markets (Girma et al, 2014) and one potential mechanism for this is through greater exposure to best practice in the international arena. As hypothesised, foreign ownership is positively correlated with HRM intensity in Britain but, contrary to expectations, this is not the case in France. Foreign-ownership is more prevalent in Britain than in France and so it is feasible that there may also be differences in the nature of foreign-ownership in the two countries, perhaps reflecting differences in the country of origin.

Product market competition: Earlier we indicated that higher levels of product market competition may serve to incentivise firms to adopt ‘best practice’ management, but may also act as a disincentive if markets are so competitive as to generate sufficient uncertainty about the ability to reap returns over the medium-term. In fact, in the specification shown in Table 5, there is no strong relationship with measures of product market competition. However, the measures available in our harmonised WERS/REPONSE dataset are not ideal and, as we shall see later in this chapter, alternative measures of competition (available only for WERS) prove more informative in confirming the benefits of greater product market competition in stimulating HRM adoption.

Skills and knowledge: in both Britain and France, workplaces with a higher share of skilled employees (i.e. managers and professionals) have higher HRM intensity. This suggests a complementarity between HRM and worker skills which has been cited elsewhere in the literature. It may also suggest a greater degree of absorptive capacity which allows the workplace to assimilate external knowledge about best practice more easily. However, this is arguably measured more directly by membership of external managerial networks.

Managerial networks: workplace membership of employer networks is positively correlated with HRM intensity, consistent with our hypotheses about the value of connections between workplace managers and those in other businesses or knowledge broking positions. However, the returns differ across network types. In Britain, membership of industry bodies is positively associated with HRM intensity, whereas this is not the case in France. In France, it is membership of employer associations, HR associations and tripartite bodies that is positively associated with HRM intensity.

The returns to membership of industry bodies in Britain suggests an influential role for trade associations as knowledge brokers in aiding the diffusion of best-practice management. In contrast, the returns to employer association membership in France may reflect the pervasive nature of industry-level collective bargaining. Mechanically, such arrangements are likely to homogenise HR practices across firms and, in most industries, large companies seek to shape industry agreements to be consistent with their own HR practices. The influence of HR associations may reflect the complexity of labour laws, which may push HR managers to share knowledge as a means of dealing with uncertainty. However, further data would be needed to explore this further.

Table 5: Regression analysis of HRM intensity at workplace-level, Britain and France

Dependent variable: HRM index (standardised)	Britain	France
Workplace and organisation demographics:		
Ln(workplace employment)	0.160***	0.211***
	(4.244)	(8.639)
Whether a single independent establishment	-0.171*	-0.226***
	(-1.677)	(-4.402)
Organisation employment (Ref. 11-99 employees)		
100-999	0.163	0.099*
	(1.539)	(1.666)
1,000-9,999	0.313**	0.155**
	(2.394)	(2.188)
10,000+	0.538***	0.185**
	(3.505)	(2.111)
Workplace age (Ref 0-4 years):		
5 to 9 years	0.175	-0.008
	(1.346)	(-0.074)
10 to 19 years	0.188	-0.045
	(1.597)	(-0.478)
20-49 years	0.200	-0.098
	(1.623)	(-1.081)
50+ years	0.008	-0.136
	(0.062)	(-1.396)

Ownership and governance:

Foreign owned organisation	0.186*	0.107
	(1.830)	(1.431)
Organisation listed on stock exchange	0.587***	0.293***
	(5.055)	(4.943)
Family-owned organisation	0.101	-0.091*
	(1.232)	(-1.842)

Nature of the product market:

Geographical scope of product market (ref. Local):		
Regional	-0.028	0.046
	(-0.279)	(0.738)
National	0.253***	0.342***
	(2.881)	(5.490)
International	0.454***	0.309***
	(4.159)	(4.322)
Organisation's share of product market (Ref. Less than 25 per cent):		
25-49 per cent	0.064	-0.053
	(0.574)	(-0.834)
50 per cent or more	0.182*	0.020
	(1.714)	(0.349)
Change in business volumes over past three years (Ref. Growing significantly):		
Growing		-0.117
		(-1.509)

Stable		-0.265***
		(-3.438)
Declining		-0.223***
		(-2.666)
Declining significantly		-0.288**
		(-2.464)
Current state of market for main product or service (Ref. Growing):		
Mature	-0.129	
	(-1.292)	
Declining	-0.153	
	(-1.530)	
Turbulent	-0.033	
	(-0.390)	
Managerial skills/experience and workforce skills:		
Main responsibility for HR (ref. HR manager):		
Owner, general manager	0.232**	0.073
	(2.494)	(1.336)
Financial manager/company secretary	0.018	0.071
	(0.126)	(0.785)
Other	-0.506**	-0.191**
	(-2.045)	(-2.374)
Job tenure of person with HR responsibility (Ref. first quartile):		
Second quartile	-0.041	0.010

	(-0.455)	(0.189)
Third quartile	-0.016	-0.027
	(-0.157)	(-0.483)
Fourth quartile	0.020	-0.100*
	(0.192)	(-1.680)
Percentage of high-skilled white-collar employees at the workplace	0.007***	0.003**
	(3.579)	(2.255)
Person responsible for HR has formal qualifications in personnel management	0.091	
	(1.157)	
Network membership:		
Member of an employers' association	-0.025	0.151***
	(-0.179)	(3.486)
Organisation is a member of a trade association or chamber of commerce	0.218***	
	(2.844)	
Sought advice on HR issues from a professional body (e.g. CIPD) in past year	-0.019	
	(-0.200)	
Workplace managers have a role in a trade association or chamber of commerce		0.063
		(1.195)
Workplace managers belong to an association of HR professionals		0.120**
		(2.322)
Workplace managers have a role on a joint or tripartite body or institution (e.g. vocational training board)		0.183***

		(3.915)
Constant	-0.982***	-1.014***
	(-3.133)	(-5.149)
Observations	1,369	3,380
R-squared	0.414	0.355

Notes:

- T-statistics in parentheses
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1
- Models estimated via OLS and include industry dummies (NACE Rev.2 Section level) and region dummies (as in Figure 3)

Looking across the piece, we see that many (though not all) of the factors included in the regression analyses presented above show similar associations with HRM intensity in both countries, suggesting that we have identified some 'universal' determinants of HRM diffusion. The degree of variance explained is also sizeable (41 per cent for Britain and 36 per cent for France). However, there remains an interest in the extent to which the covariates in the model serve to explain the regional variance in HRM intensity discussed in the previous chapter. The coefficients on the region dummies are not shown in Table 5, but in Table 6 and Table 7 we focus on the degree to which HRM intensity varies across regions in Britain within three model specifications.

The first regressions in Table 6 and Table 7 contain region dummies only, with no additional controls, thus capturing the raw correlation between a workplace's regional location and HRM intensity. The second column controls for those demographic characteristics of workplaces and organisations shown above in the first panel of Table 5. The third and final column controls for the four additional sets of covariates which make up the full specification shown above, namely those relating to: the ownership and governance arrangements at the workplace; the nature of the workplace's product market; the skills of management and non-managerial employees; and network membership.

Column 1 of Table 6 reveals that the regional dummies are jointly statistically significant for Britain (p<0.001), with workplaces in all regions having significantly lower HRM intensity, on average, than their counterparts in London which is the reference category. Regional variance accounts for 6 percent of the across workplace variance in HRM intensity. HRM intensity is lowest in Wales, where the average number of HRM practices is one standard deviation (around 2.5 practices) lower than in London. In column 2 these differentials remain statistically significant (p=0.003) having netted out workplace structural and demographic differences, but the size of the differentials is attenuated somewhat such that two regions (the South East and the East Midlands) are no longer distinguishable from London in terms of HRM intensity. The addition of the remaining controls in column 3 means the model accounts for over two-fifths of the variance in HRM intensity across workplaces. The addition of these controls leads to

further attenuation in the regional correlation with HRM intensity, such that the region dummies are now only on the margins of statistical significance at the 1 per cent level (p=0.014) and now workplaces in the East of England join those in the South East and the East Midlands as not significantly different from those in London in terms of their HRM intensity. Workplaces in Wales continue to have fewer practices than those elsewhere (the difference of 0.6 standard deviations equates to around 1.4 fewer practices on average than workplaces in London), but the differential with London has fallen by over two-fifths compared with column 1.

Table 7 presents similar estimates for workplaces in France. In a model with no other controls the region dummy variables account for a little over 1 percent of the variance in HRM intensity across French workplaces – lower than the equivalent model for Britain in Table 6 – and differences across regions are smaller: the gap between Centre Val de Loire and Pays de la Loire is around half a standard deviation, or around 1.25 practices, on average. As in the British case, these regional differentials fall somewhat with the addition of controls, but not to the same extent as in Britain. In particular, the addition of workplace and organisation demographics has a less dramatic effect than in the British case, perhaps suggesting that strong regional hubs in France serve to limit compositional differences between regions to a greater extent than in Britain. Moving to the full model, the region dummies remain jointly statistically significant (p=0.002) and the gap between Pays de la Loire and Centre Val de Loire falls to around one third of a standard deviation.

Table 6: Regression analysis of cross-regional variance in HRM intensity, Britain

Dependent variable: HRM index (standardised)	**(1)**	**(2)**	**(3)**
NUTS1 regions (Ref. London):			
South East	-0.320**	-0.221	-0.163
	(-2.008)	(-1.442)	(-1.464)
East Midlands	-0.389*	-0.235	-0.040
	(-1.760)	(-1.352)	(-0.254)
South West	-0.448**	-0.349**	-0.250*
	(-2.239)	(-2.178)	(-1.844)
North West	-0.546***	-0.498***	-0.334***
	(-3.522)	(-3.614)	(-2.820)
Yorks and Humber	-0.560***	-0.512***	-0.461***
	(-2.697)	(-2.946)	(-2.990)
Scotland	-0.609***	-0.441***	-0.257**
	(-3.726)	(-2.896)	(-1.994)
East of England	-0.620***	-0.341**	-0.238
	(-3.763)	(-2.075)	(-1.599)
North East	-0.758***	-0.594***	-0.419***
	(-3.473)	(-3.388)	(-2.745)
West Midlands	-0.778***	-0.559***	-0.428***
	(-4.207)	(-3.503)	(-3.054)
Wales	-1.000***	-0.672**	-0.553**
	(-4.716)	(-2.551)	(-2.299)
Workplace and organisation demographics	No	Yes	Yes
Ownership and governance characteristics	No	No	Yes
Nature of the product market	No	No	Yes

Managerial skills/experience and workforce skills	No	No	Yes
Network membership	No	No	Yes
Observations	1,369	1,369	1,369
R-squared	0.063	0.294	0.414
F-test of regional dummies	3.88	2.63	2.23
Prob>F	0.000	0.003	0.014

Notes:

- Model specification as in Table 5 (column 1)
- T-statistics in parentheses
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1

Table 7: Regression analysis of cross-regional variance in HRM intensity, France

Dependent variable: HRM index (standardised)	**(1)**	**(2)**	**(3)**
Approx. NUTS1 regions (Ref. Ile de France):			
Centre Val de Loire	0.235**	0.291**	0.295***
	(2.076)	(2.567)	(2.696)
Auvergne Rhone Alps	0.124	0.186**	0.203***
	(1.476)	(2.434)	(2.726)
Bourgogne-Franche-Comte	0.103	0.247**	0.281***
	(0.948)	(2.414)	(2.902)
Provence Alps Cote D'Azur	0.070	0.116	0.141
	(0.646)	(1.254)	(1.638)
Brittany	-0.019	0.054	0.156
	(-0.144)	(0.439)	(1.358)
Nord Pas de Calais Picardie	-0.038	0.025	0.070
	(-0.386)	(0.287)	(0.847)
Normandy	-0.105	-0.020	-0.003
	(-0.931)	(-0.207)	(-0.038)
Languedoc Roussillon Midi Pyrénées	-0.110	0.013	0.107
	(-1.022)	(0.122)	(1.115)
Aquitaine Limousin Poitou Charentes	-0.136	-0.020	0.013
	(-1.465)	(-0.242)	(0.171)
Alsace Champagne Ardenne Lorraine	-0.150	-0.030	-0.017
	(-1.619)	(-0.364)	(-0.205)
Pays de la Loire	-0.243**	-0.121	-0.076
	(-2.019)	(-1.092)	(-0.724)
Workplace and organisation demographics	No	Yes	Yes

Ownership and governance characteristics	No	No	Yes
Nature of the product market	No	No	Yes
Managerial skills/experience and workforce skills	No	No	Yes
Network membership	No	No	Yes
Observations	3,380	3,380	3,380
R-squared	0.014	0.268	0.355
F-test of regional dummies	2.51	2.40	2.23
Prob>F	0.004	0.006	0.002

Notes:

- Model specification as in Table 5 (column 2)
- T-statistics in parentheses
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1

Whilst the various characteristics included in our full model specification have thus accounted for some of the regional variation in HRM intensity in each country, it is apparent that a substantial part of the variance between and within regions remains to be explained by factors that are not available within our harmonised WERS/REPONSE dataset. To develop this analysis, we therefore augment our dataset with additional covariates.

In the first step, we take advantage of the availability of NUTS3 identifiers in both datasets to match on a measure of the distance from the workplace's NUTS3 region to the 'frontier region' in either country. We take the 'frontier region' to be either the capital city or the NUTS3 region with the highest level of HRM intensity. In Britain, London fulfils both criteria. In France, the capital city, Paris, is not the region with the highest HRM intensity: this position is held by Loir-et-Cher. The NUTS3 distance measure is taken from Eurostat and allows us to assess the situation in Britain and France using comparable data. However, we also undertake a sensitivity test with the British data, in which we replace the NUTS3-level distance measure with a more detailed measure computed from each MSOA.

The 'hub-and-no-spokes' thesis set out in Chapter 2 would anticipate that HRM intensity may decline in Britain as one moves further from the 'frontier region' (London), but we suggested that the relationship might be weaker in France due to its strong regional hubs. The evidence from our rather simple regression analysis is at least partially consistent with this hypothesis. When the distance measures are added to the specification reported in Table 5, they are non-significant in both countries (see column 1 of Table 8). However, when the NUTS1 region dummies are removed, both the NUTS3 and MSOA measures for Britain are negative and statistically significant. In contrast, the NUTS3 indicators remains non-significant in France. This suggests that there is a broad, negative correlation between distance from London and HRM intensity in Britain, but that it operates at a fairly aggregated level. HRM intensity is lower in those NUTS1 regions that are more distant from London, but no additional penalty is observable for being at a more distant point within those regions. In contrast, there is no observable relationship between HRM intensity and distance from either Paris or Loir-et-Cher in France, perhaps because of the greater influence of regional hubs.[29]

One potential avenue for further research would be to examine the influence of distance from regional cities in either country.

[29] A sensitivity check using the journey time data for France, discussed in Chapter 3, revealed a similar pattern of results.

Table 8: Regression analysis showing correlation between HRM intensity and distance to capital city, Britain and France

Dependent variable: HRM index (standardised)	With region dummies	Without region dummies
Britain:		
Model A: Distance from NUTS3 region to London (‘00s km)	-0.023	-0.036***
	(0.565)	(-2.60)
Model B: Distance from MSOA to London (‘00s km)	-0.015	-0.123**
	(0.185)	(-3.91)
France:		
Model C: Distance from NUTS3 region to Paris (‘00s km)	-0.003	0.014
	(-0.129)	(1.574)
Model D: Distance from NUTS3 region to Loir-et-Cher (‘00s km)	-0.016	0.013
	(-0.700)	(1.120)

Notes:

- Model specifications as in Table 5
- Standard errors are clustered at regional level
- T-statistics in parentheses
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1

In the second phase of our extended analysis, we move to a Britain-only specification in which we are freed from the constraints of harmonisation with the REPONSE data. We are then able to introduce improved measures for some of our standard covariates, as well as using the availability of workplace postcodes to expand the list of local area characteristics, all with the aim of accounting for a greater share of the variance in HRM intensity in Britain. The results are presented in Table 9, with the revised and additional covariates all marked with an asterisk (*).

We first improve on the specification presented in Table 5 by replacing the indicator of competition and by adding an additional indicator of workforce skills (Table 9, models M2 and M3). Our preferred measure of competition is taken from a question which asks the workplace manager to gauge the degree of competition in the market for their main product or service, using a five-point scale from 'Very high' to 'Very low'. Few respondents choose the final category and so we combine 'Low' and 'Very low' for the purposes of analysis. This indicator proves more informative than the indicator of the current state of the market used in Table 5; now we find that HRM intensity is highest in very competitive product markets, in line with conventional theory and other evidence. Specifically, workplaces in highly competitive product markets (around one third of the weighted sample) have HRM scores that are around one quarter of a standard deviation higher than those in markets with neither high nor low. There is no strong evidence of the inverted U-shaped pattern suggested in Chapter 2: instead, HRM intensity is slightly higher in markets with low competition than in markets with medium levels of competition, but the difference is not statistically significant.[30]

Our additional measure of workforce skill is taken from the WERS Survey of Employees, which surveys a random sample of 25 employees at the workplace. We use this linked employer-employee sample to generate an estimate of the share of employees at the workplace who have a degree-level qualification. When added to the specification, this variable is positive and statistically significant, indicating a complementarity between workforce skills and the use of 'best practice' management.

Our final specifications then augment this model with characteristics of the area in which the workplace is located (see Table 9, models M4 and M5). We add measures of the distance of the NUTS3 region from London, the availability of qualified workers in the local education authority (LEA) and the employment density in the NUTS3 region.

Workplaces in local areas where there is a greater supply of qualified employees have higher levels of HRM intensity, after controlling for other factors. Sensitivity tests indicate that, for managers and professional employees, the possession of a degree in Business Administration is the most relevant factor, whereas for employees in other occupation groups, it is the possession of other degrees which is most salient. One possibility is that a greater supply of qualified workers in the local area surrounding the workplace serves to reduce the price of employing skilled workers (see Feng and Valero, 2019). However, the effect is observed even after controlling for the qualifications of the employees inside the workplace. This suggests an alternative channel, which is that the greater availability of qualified managers and employees in the local area may increase the availability of local knowledge about best-practice management (or means of implementing it), which the workplace can absorb via its participation in either formal or informal networks.

An indicator of the distance of the workplace to the nearest business school appearing in the Financial Time's European rankings for 2011 was positively associated with HRM intensity in a

[30] Note that foreign ownership is no longer statistically significant under this specification.

bivariate regression but did not add any explanatory power to the model once added alongside these other controls (whether including or excluding the local skills supply indicators).

The distance of the workplace from London is not statistically significant in the full model (M4). However, it becomes statistically significant after removing the NUTS1 region dummies (as was the case in Table 8). This provides a further indication that some part of the variance in HRM intensity across NUTS1 regions is due to differences in distance from the capital.

The negative association with the employment density of the workplace's NUTS3 region is somewhat unexpected but is consistent with Gordon and McCann's (2000) conjecture that workplaces may find other ways to gain competitive advantage in spatially concentrated markets, other than moving to the frontiers in terms of workplace management. This would be an additional avenue for further research.

Table 9: Regression analysis of HRM intensity in Britain, with additional local area covariates

Dependent variable: HRM index (standardised)	**M2**	**M3**	**M4**	**M5**
Workplace size: Ln(employees)	0.112***	0.146***	0.145***	0.147***
	(3.105)	(3.841)	(4.089)	(4.156)
Single independent establishment	-0.188*	-0.166	-0.160	-0.164
	(-1.755)	(-1.605)	(-1.528)	(-1.602)
Organisation size (ref. Less than 100 emps)				
100-999 employees	0.179*	0.199*	0.224**	0.230**
	(1.696)	(1.922)	(2.030)	(2.116)
1000-9999 employees	0.361***	0.439***	0.469***	0.476***
	(2.827)	(3.392)	(3.332)	(3.331)
10,000 employees or more	0.476***	0.557***	0.553***	0.560***
	(3.319)	(3.858)	(3.652)	(3.700)
Workplace age (ref. Less than 5 years)				
5-9 years	0.231*	0.197	0.182	0.180
	(1.699)	(1.480)	(1.436)	(1.426)
10-19 years	0.201	0.185	0.177	0.167
	(1.641)	(1.530)	(1.504)	(1.384)
20-49 years	0.272**	0.256*	0.245*	0.237*
	(2.149)	(1.958)	(1.863)	(1.766)
50+ years	0.036	0.005	-0.008	-0.017
	(0.263)	(0.038)	(-0.056)	(-0.121)
Foreign owned, 51 per cent or more	0.151	0.147	0.139	0.129
	(1.399)	(1.398)	(1.156)	(1.080)
Listed on stock exchange	0.632***	0.580***	0.527***	0.516***

	(5.167)	(4.943)	(5.074)	(4.749)
Family owned, 50+	0.047	0.076	0.075	0.074
	(0.554)	(0.936)	(0.990)	(0.977)
Geographical scope of product market (Ref. Local):				
Regional	-0.016	-0.036	-0.022	-0.031
	(-0.144)	(-0.350)	(-0.211)	(-0.308)
National	0.298***	0.245***	0.216**	0.213**
	(3.238)	(2.681)	(2.538)	(2.496)
International	0.501***	0.422***	0.393***	0.382***
	(4.280)	(3.715)	(3.415)	(3.337)
Organisation's share of product market (Ref. Less than 25 per cent):				
25-49 per cent	0.058	0.092	0.082	0.083
	(0.474)	(0.833)	(0.806)	(0.786)
50 per cent or more	0.163	0.194*	0.176	0.180
	(1.432)	(1.687)	(1.547)	(1.530)
*Degree of product market competition (ref. Neither high nor low)				
Very high	0.272**	0.262**	0.230*	0.210*
	(2.154)	(2.103)	(1.880)	(1.656)
High	0.202*	0.199*	0.176	0.162
	(1.678)	(1.706)	(1.493)	(1.333)
Low/very low	0.129	0.122	0.109	0.089
	(0.746)	(0.731)	(0.629)	(0.527)
Person in charge of HR (ref. HR manager)				
Owner-manager		0.291***	0.288***	0.284***
		(3.276)	(3.081)	(3.039)
Finance manager		0.067	0.080	0.088

	(0.447)	(0.540)	(0.604)
Tenure of person in charge of HR (years)	0.003	0.003	0.004
	(0.575)	(0.495)	(0.610)
Percentage of employees in SOC1/SOC2	0.007***	0.006***	0.006***
	(3.443)	(3.487)	(3.582)
Person in charge of HR has an HR qualification	0.128	0.144*	0.137*
	(1.601)	(1.715)	(1.694)
*Percentage of employees with a degree	0.003*	0.003*	0.004**
	(1.914)	(1.894)	(2.031)
Member of employers' association	-0.011	-0.018	-0.002
	(-0.088)	(-0.145)	(-0.014)
Member of trade association	0.205***	0.205***	0.203**
	(2.814)	(2.648)	(2.580)
Member of other similar body	-0.121	-0.124	-0.121
	(-1.461)	(-1.468)	(-1.412)
Any HR advice sought from outside in previous 12 months	0.098	0.075	0.083
	(1.163)	(0.908)	(0.985)
*Distance to London (MSOA based, '00s km)		0.048	-0.076**
		(0.569)	(-1.987)
*Percentage of SOC1/SOC2 employees in LEA with business degree		0.024*	0.024**
		(1.875)	(2.068)
*Percentage of SOC3-SOC9 employees in LEA with other degree		0.022***	0.015***
		(3.941)	(3.578)
*Employment density of NUTS3 region (Ref. 0-90 persons/km2)			

100-249 persons/km2			-0.030	-0.020
			(-0.232)	(-0.203)
250-499 persons/km2			-0.053	-0.098
			(-0.411)	(-0.956)
500-1,999 persons/km2			-0.100	-0.145
			(-0.874)	(-1.503)
2,000 persons/km2 or more			-0.470***	-0.436**
			(-2.808)	(-2.490)
Workplace characteristics	Yes	Yes	Yes	Yes
Workforce characteristics + networks	No	Yes	Yes	Yes
Local area characteristics	No	No	Yes	Yes
Region dummies	Yes	Yes	Yes	No
Observations	1,392	1,392	1,392	1,392
R-squared	0.380	0.424	0.438	0.428

Notes:

- T-statistics in parentheses
- Standard errors are clustered by region
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1
- Models include industry dummies (NACE Rev.2 Section level) and (with the exception of column 5) region dummies.
- Asterisks identify covariates which have been revised or added, when compared with Table 5.
- Coefficients on region dummies reported in Table 10.

Finally, we take the specifications M2-M4 shown in Table 9 and examine the pattern of coefficients across the NUTS1 regions in these models. The coefficients are shown in Table 10.[31] One striking feature of this table is the substantial decrease in the magnitude of the Wales coefficient when local area characteristics are added to the model in M4. The addition of these characteristics (distance from London, supply of local skills and local employment density) reduces the size of the London advantage over the lowest-HRM region by around one fifth. The reduction in the magnitude of the coefficients means that the difference between London and Wales is no longer statistically significant and, indeed, London no longer stands alone as the region with the highest levels of HRM intensity.

The East Midlands now assumes the position of HRM leader, closely followed by the South East. These are the only two regions that now have a significantly higher level of HRM intensity than Wales. Moreover, the region dummies are no longer jointly statistically significant (Prob>F=0.40). The full specification has thus accounted for a considerable share of the cross-regional variance in HRM intensity that was apparent in the initial descriptive analysis (Figure 2 and Figure 3).

[31] M3 in Table 6.7 is the equivalent of column 3 in Table 6.2; the difference is that Table 6.7 uses a different (improved) measure of competition and adds a measure of the share of employees at the workplace with a degree-level qualification.

Table 10: Regression analysis of cross-regional variance in HRM intensity, Britain

Dependent variable: HRM index (standardised)	**M1**	**M2**	**M3**	**M4**
NUTS1 region (Ref. London):				
South East	-0.279*	-0.139	-0.062	0.123
	(-1.796)	(-1.127)	(-0.557)	(0.734)
E Midlands	-0.386*	-0.065	-0.007	0.231
	(-1.745)	(-0.380)	(-0.041)	(1.101)
South West	-0.459**	-0.305**	-0.225*	-0.084
	(-2.389)	(-2.114)	(-1.727)	(-0.340)
Yorks and Humber	-0.545***	-0.470***	-0.390**	-0.263
	(-2.614)	(-2.785)	(-2.546)	(-0.944)
East of England	-0.556***	-0.152	-0.069	0.094
	(-3.253)	(-0.948)	(-0.439)	(0.518)
North West	-0.568***	-0.364***	-0.312**	-0.176
	(-3.613)	(-2.843)	(-2.525)	(-0.642)
Scotland	-0.591***	-0.278**	-0.180	-0.004
	(-3.651)	(-2.031)	(-1.372)	(-0.020)
W Midlands	-0.722***	-0.311**	-0.277**	-0.035
	(-3.895)	(-2.102)	(-2.012)	(-0.174)
North East	-0.727***	-0.415**	-0.336*	-0.244
	(-3.246)	(-2.221)	(-1.939)	(-0.707)
Wales	-1.010***	-0.596**	-0.508*	-0.407
	(-4.508)	(-2.035)	(-1.830)	(-1.209)
Workplace characteristics	No	Yes	Yes	Yes
Workforce characteristics + networks	No	No	Yes	Yes
Local area characteristics	No	No	No	Yes

Observations	1,392	1,392	1,392	1,392
F-test	3.62	1.92	1.78	1.05
Prob>F	<0.01	0.04	0.06	0.40

Notes:

- Model specifications as in Table 9
- T-statistics in parentheses
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1

In our final set of analyses, we investigate the potential role of production networks in aiding the diffusion of HRM. As indicated earlier, we construct three proxies to measure the potential for spillovers from other parts of the workplace's production network. These proxies capture the HRM intensity of: other workplaces in the sampled workplace's own industry; workplaces in its likely upstream supply chain; and workplaces in its likely downstream supply chain. We find that the HRM intensity of the sampled workplace is positively associated with all three measures in the absence of other control variables. It remains positively associated with HRM elsewhere in its industry and with HRM in its likely downstream supply chain after the addition of the full set of controls contained in Table 9. We take this as suggestive evidence of spillovers from other workplaces that the sampled workplace may interact with, e.g. through buyer-supplier relationships. It is not clear as to why there should only be an association with downstream HRM and not upstream HRM, but casual observation of industries such as car manufacture indicates that frontier firms are more likely to be at the end of supply chains than at the origin. Barnard et al's (2019) analysis of the importance of production networks in explaining variations in firm size also finds a dominant role for downstream relationships.

Table 11: Production networks and HRM intensity at workplace level

	M1	M2
Mean HRM elsewhere in the industry	0.180***	0.091**
	(3.886)	(2.308)
Upstream HRM	0.122**	0.062
	(2.220)	(1.007)
Downstream HRM	0.177**	0.147**
	(2.404)	(2.586)
Controls	No	Yes
Observations	1,383	1,383
R-squared	0.076	0.405

Notes:

- Model M1 has no other controls; Model M2 follows Model M4 of Table 9, omitting the industry dummies.
- T-statistics in parentheses
- Standard errors are clustered by two-digit industry
- Key to statistical significance: *** p<0.01; *** p<0.05; * p<0.1

7. Conclusions and policy implications

Summary of the research

The foregoing chapters have presented research on regional variation in HRM and related management practices using workplace-level (i.e. plant-level) data in Britain, taken from the Workplace Employment Relations Survey (WERS). We have used these workplace data to map spatial variance in HRM intensity in Britain, and we have then sought to account for that variance. In doing so, we have sought to establish whether regional variance in HRM can help to account for the substantial degree of regional variance in productivity which is apparent within the UK.

The analysis has been complemented by a comparative investigation of equivalent data for France. The comparison is valuable because France has a notable productivity lead over the UK, but also a lower degree of variance in productivity across its regions.

In summary, we find that there is considerable regional variance in HRM intensity in Britain. This regional variance is positively correlated with regional differences in productivity. The extent of spatial variance in HRM intensity is larger in Britain than in France, and some part of this difference can be attributed to greater variance in the composition of Britain's regions. However, there are also a number of universally relevant factors which are associated with HRM diffusion in both countries. These include product market competition, participation in international markets and membership of networks for knowledge sharing. When we combine these characteristics with information on the local skills supply and the position of the workplace in production networks – indicative of 'spillover' effects from the area or industry in which the workplace is located – we are able to explain much of the regional variance in HRM intensity in Britain. Our results therefore go some way towards identifying relevant policy initiatives which may assist in reducing regional imbalances.

Policy implications

The policy implications that arise from the research can be discussed in two broad strands.

First, the findings suggest that policy makers should continue their support for a number of long-standing initiatives. One of these is to support the development of competition in product markets. Many parts of the UK economy are already highly competitive but, as in all economies, there are a substantial minority of workplaces where levels of competitive pressure are relatively low. Competitive pressure provides incentives for firms to move towards the production frontier by seeking out and implementing managerial best-practice. In our analysis, workplaces in highly competitive product markets had HRM scores around one quarter of a standard deviation higher than those in markets where competition was 'neither high nor low'. This adds to plentiful existing evidence that firms in more competitive markets are better managed – and hence more productive (e.g. Bloom et al, 2019).

Our findings also provide support for existing initiatives to encourage firms to expand into larger markets, particularly international markets. Although there is likely to be an element of self-selection, evidence suggests that firms do obtain productivity benefits from operating in larger markets (Girma et al, 2014). One potential mechanism for this is through their contact with other firms at the production frontier, and thus through greater exposure to influences –

such as cutting-edge management practices – which may not be present in smaller, local markets.

The findings also provide support for long-held commitments to support the supply of high-level skills into local labour markets. Our research focuses on degree-level education, which has widely acknowledged positive effects on productivity (Holland et al, 2013). The analysis shows that workplaces with larger shares of graduates have higher levels of HRM intensity. There are also further benefits accruing to workplaces located in areas where graduates are more plentiful. One reason could be that best-practice management is 'skill-biased', such that implementation is easier or less costly when skilled workers are easier to hire (see Feng and Valero, 2019). But the fact that we observe positive returns to local skill levels after controlling for the qualifications of the employees inside the workplace suggests the presence of positive externalities, which may arise from workplaces absorbing information about best-practice management (or the means of implementing it) from knowledgeable managers or employees nearby.

This points to the second strand of policy implications, which focuses on the value of providing support for a broad range of initiatives to foster knowledge-sharing and network development. This can involve supporting the work of knowledge brokers. Our findings are not entirely clear-cut in this respect: we find that workplaces belonging to trade associations have higher levels of HRM intensity but, in our analysis, the benefits are reduced for membership of employers' associations or HR associations. Some of these have a long history of supporting the diffusion of management best practice. However, membership of such organisations seems to make more of a difference in France. This is perhaps one area worthy of further investigation.

Policy support for knowledge-sharing and network development can also involve supporting the work of institutions which are seeking to connect frontier firms with less well-managed firms that have some element of shared experience or interest. Our results suggest that benefits can accrue both horizontally (i.e. within a sector) and also vertically (along supply chains). This suggests that value may be obtained from the work of organisations such as Be the Business and programs such as Productivity Through People which are seeking to encourage businesses to adopt practices that have proven to be beneficial for others. However, building the incentives for firms to participate in such activities is likely to be key to their overall success.

Areas for further research

Naturally, the findings also suggest some areas where further research would be beneficial.

First, it would be beneficial to develop more understanding of the relative importance of proximity to London versus proximity to regional cities in the diffusion of best-practice. Whilst London is the clear leader in terms of both productivity and HRM intensity in Britain, the hegemony of the capital city is less clear cut in France. This may be a function of differences in the relative strength of regional 'hub' cities in the two countries, or perhaps of differences in the relative strength of the 'spokes' (e.g. the transport links) connecting other parts of the country to the capital. Further research is needed to understand how firms benefit (or not) from proximity to a strong regional centre.

Second, it would be beneficial to investigate further the role of agglomeration more generally in supporting the adoption of best-practice management. Much of the existing literature provides evidence of the positive benefits of agglomeration, but our findings suggest that workplaces in

areas with very high employment density are less well managed than those in less densely populated areas. This may reflect firms' endogenous location decisions but, with evidence that the underperformance of Britain is driven by its cities (Centre for Cities, 2017), it may be that the links between agglomeration and management practice are worthy of further attention.

Finally, it is important to note that the connections we have made in this report between management practice and productivity at regional level are somewhat circumstantial. We have not sought to establish an independent association between regional management practice and regional productivity, nor to establish any causal link. When placed alongside the growing evidence that management practices positively (and causally) affect productivity at firm level, the analysis does suggest that management plays a role in contributing to regional productivity differentials. However, further research based on rich workplace datasets (like WERS) which can be linked to data on firm-level productivity, and analysed with specific attention to regional variance, would add considerably to the evidence base on the importance of HRM diffusion in explaining regional productivity imbalances within the UK.

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