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Cultural diversity and entrepreneurship in England and Wales

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Abstract

British regions are becoming increasingly culturally diverse, with migration as the main driver. Does this diversity benefit local economies? This research examines the impact of cultural diversity on the entrepreneurial performance of UK regions. We focus on two largely overlooked factors, the measurement of diversity, and the skills composition of diverse populations. First, more that demonstrating the importance of cultural diversity for entrepreneurship, we show that the type of cultural diversity measured is a decisive factor. Second, the skill composition of diverse populations is also key. Diversity amongst the ranks of the highly skilled exerts the strongest impact upon start-up intensities. The empirical investigation employs spatial regression techniques and carriers out several robustness checks, including instrumental variables specifications, to corroborate our findings.

JEL codes: J24, L26, M13, F22

Keywords: Entrepreneurship, cultural diversity, high-skilled migration, knowledge spillovers.

1 Introduction

The UK, like many industrialised countries, has become considerably more diverse in recent decades. From 1991 to 2011 the foreign-born population of the UK rose by 4 million to 7.5 million people, or 13% of the population. Whilst the magnitude of migration is notable, what is more striking is the diversity of contemporary migration. In this respect, several parts of the UK – and London in particular – are now noted for having become 'super-diverse' (Vertovec 2007). The implications of these demographic changes have attracted wide-ranging discourse across scientific disciplines, spanning sociology, political science, and economics, among others. Attention paid to the impact of diverse, mass migration on the labour market outcomes of new migrants and native workers, for instance, has received relatively considerable attention (Kerr and Kerr 2011). The nature of self-employment and entrepreneurship among growing ethnic and migrant communities has also sparked considerable debate (Kloosterman and Rath 2003; Syrett and Sepúlveda 2011). Considerably less is known, however, about the wider, dynamic impacts of migration and the diversity it brings about.

Over the last decade, evidence in support of a 'diversity dividend' in terms of creativity (Florida 2002; Anderson *et al* 2005), innovation (Niebuhr 2010; Özgen *et al* 2011), and productivity (Ottaviano and Peri 2006; Südekum *et al* 2009; Trax *et al* 2012) has mounted. This literature contends that cultural heterogeneity within a labour force expands the collective variety of skills, knowledge, and ideas that are contained within it, becoming a vital and 'precious economic asset' for a regions economic development (Jacobs 1961: 219). In tandem, the topic of entrepreneurship has also received significant attention. Most analyses in the two fields, until recently, have been independent from one another, but increasingly efforts are being made to connect the two, The convergence in the two topics is partly a result of a greater appreciation of regional variations in entrepreneurship rates (Malecki 1997; Armington and Acs 2002), and particularly a branch of studies that analyse the extent to which knowledge abundant regions exhibit greater levels of new business creation (Audretsch and Keilbach 2007). This perspective views entrepreneurship as an endogenous response to the local knowledge environment, placing the characteristics of the region under the analytical microscope. The knowledge spillover theory of entrepreneurship is a particularly notable example, utilised as the theoretical backbone of our empirical investigation. Broadly, our findings suggest that culturally diverse regions tend to be more entrepreneurial, particularly with respect to more knowledge intensive activities, and, more specifically, that diversity amongst the highly skilled matters most of all.

The remainder of this paper is structured as follows. The following section considers the growing importance of cultural diversity from an economic and entrepreneurial point of view and presents the key hypotheses made. Section 3 introduces the data for England and Wales and describes our empirical strategy. Section 4 presents our discussion of the results. Finally, section 5 concludes.

2 The entrepreneurial value of cultural diversity

Why should diversity matter from an economic point of view? It seems natural to assume that any population is endowed with varying types and levels of technical knowledge and capacities to problem-solve. Noteboom's (2000) notion of 'cognitive distance' infers that the differentiated experiences and upbringings of individuals – perhaps developed in different cultural environments – shapes the idiosyncratic ways in which different people interpret, understand and evaluate the world around them. Higher diversity, thus, may benefit local economies by expanding the local knowledge base, and accordingly its absorptive capacity (Cohen and Levinthal 1990), thereby increasing the region's ability to recognise, assimilate, and exploit new knowledge (Hong and Page 2001).

The recent knowledge spillover theory of entrepreneurship (KSTE) framework is built on the premise that investments in research – in universities, firms, and R&D labs – leads to new opportunities that are ripe for commercial exploitation. Yet, due to intrinsic uncertainties associated with new knowledge (Arrow 1962) – leading to asymmetric evaluations of their market potential – only a proportion of these opportunities will be pursued by the innovating organisation. As a result, residual, unrealised opportunities – represented by the KSTE 'knowledge filter' – can represent important resources for prospective entrepreneurs to identify and exploit (Acs *et al* 2009). Accordingly, the KSTE has encouraged greater analytical consideration of region-specific factors, such as regional diversity.

Audretsch *et al* (2010) and Cheng and Li (2012) are the only studies, to our knowledge, that examine the value of cultural diversity for entrepreneurship (for the Germany and the US, respectively). Both utilise the KSTE framework as the starting point for their analyses, building the urban economic diversity argument into the more generalised KSTE model. Our empirical analysis continues in this tradition and explores two underdeveloped themes on the 'wider effects' of diversity, namely, the 'type' of diversity measured, and the skill composition of diversity. Hence, we form our opening hypotheses:

H_1 *Cultural diversity is positively associated with entrepreneurship.*

Diverse populations may provide a richer mix of skills, tastes and ideas, which span across a wider range of cultures (Sobel *et al* 2010). Migrant mobility fosters a process of 'brain circulation', facilitating the exploitation of their accumulated knowledge and networks to start new firms (Saxenian 2005). Diverse, international social networks are an additional resource for aiding the discovering and commercialising of opportunities (Davidsson and Honig 2003) and forging knowledge 'pipelines' between countries to boost innovation and entrepreneurship (Bathelt, Malmberg and Maskell 2004). The wider range of talents and expertise contained within diverse populations also gives rise to skill complementarities, frequently associated with improved problem solving abilities and greater creativity within organisational teams (Shachaf 2008). Most generally, migrants may be inherent risk-takers by nature (Rath 2006; Metcalf, Modood, and Virdee 1996), with UK research revealing that migrants are twice as likely as natives to engage in entrepreneurship (Hasan 2011). As such, diverse populations may not only create more knowledge spillovers and more potential for entrepreneurship, but, by being better able to exploit a larger pool of talents, perspectives and social connections, may also be more responsive to the recognition and exploitation of gaps or opportunities in the regional economy (Eraydin *et al* 2013). Thus, these direct and indirect supply-side impacts on the dynamics of entrepreneurship collectively influence a region's knowledge stock, the knowledge spillovers that take place, and the idiosyncratic ways in which knowledge with commercial potential is appraised and exploited.

There are also important demand side impacts of diversity on entrepreneurship. The expansion of migrant populations can create significant culture-specific demands for products and services. Where incumbent firms fail to serve these demands, local entrepreneurs can realise the unexploited market opportunities by starting a new business.

The link between diversity and positive economic outcomes does, however, implicitly assume some degree of cohesion and interaction between diverse peoples. Whilst, cultural diversity is frequently used as a proxy for a region's openness, inclusiveness and tolerance (cf. Florida 2002), the terms are far from synonymous (Qian 2013). Kemeny (2012), for example, describes the mediating role of institutions in the relationship between diversity and economic performance at the regional level in the US. Diversity is most productivity enhancing in regions with stronger informal institutions. This has also been widely demonstrated in cross-country analyses (Sobel *et al* 2010).

Diversified populations can make communication more complex and costly (Collier 2001; Putnam 2007). Differences in culture, incompatible social norms, and linguistic barriers can become serious impediments to communication and knowledge-exchange (Parrotta *et al* 2012). Limited interaction across communities can lead to lower levels of social trust and misunderstandings between diverse groups, and in the worst case, racist exclusion, crime, and social conflict (Easterly and Levine 1997; Saxenian 1999; Alesina and La Ferrera 2005). Although most of the studies evidencing a negative association between diversity and trust are focussed on the US (Rothstein & Uslaner, 2005) similar research from the EU (Hooghe *et al* 2009) and the UK (Letki 2008) are far less conclusive. We explore related themes in our remaining hypotheses.

H_2 The connection between diversity and entrepreneurship may be highly sensitive to the measure of diversity implemented.

It is a perennial challenge for researchers to empirically operationalise the concept of cultural diversity. The literature has largely focussed on singular definitions of diversity to date, such as country of birth, nationality, or language, among others. In reality, a myriad of factors, including culture, nationality, ethnicity, age, language, lifestyle, education, religion, and gender, may collectively shape diversity as a notional resource. Thus, the use of singular dimensions risks imperfectly capturing the inherent complexities that are associated with diversity (McGuirk and Jordan 2012). Whilst most measures based on these different dimensions are likely to be highly correlated, there are also important dissimilarities. However, the comparison of different diversity measures is seldom carried out in existing research.[1]

Inspired by Lee (2011), our research ponders if birthplace diversity is more valuable for entrepreneurship than ethnic diversity. New migrants are more likely to possess highly distinctive knowledge, and skills that are complementary to the native workforce – particularly if the migrants are highly skilled (Farndale *et al* 2010) – as well as strong, exploitable linkages to external markets. As shown by Nathan and Lee (2013) at the organisational level, diverse management teams not only increase the rate of innovation, but are also important for forging links international markets, both greatly beneficial to the regional knowledge environment. If true, a group of foreign-born migrants may be considered more knowledge-diverse, expanding the regions knowledge stock more widely, and be more valuable from an entrepreneurship point of view. By contrast, second, third, and subsequent generations of migrants – raised and educated alongside the native population – will generally possess fewer distinctive culture-specific qualities by comparison (Alesina *et al* 2013).

This contention is, however, far from clear-cut. UK-born and naturalised cultural minorities may counteract any deficiencies in distinctive, culture-specific knowledge by simply being better able to integrate and make use of the distinctive assets that they do possess. Naturalised minorities may not only have a greater understanding of employment and business opportunities within the regional environment, but may also be better equipped to exploit their distinctive culture-specific capabilities. Inter-generational resources, such as strong familial support networks, and hybrid identities that bridge across cultures may be particularly important for starting new businesses (Smallbone *et al* 2005; Syrett and Sepúlveda 2011). For new migrants, social, cultural and linguistic barriers are known to block labour market mobility (Rath 2006), access employment opportunities commensurate

[1] An exception is Alesina *et al*'s (2013) cross-country study of diversity and economic prosperity.

with their level of human capital, which, if true, will act as an impediment to the sharing and dissemination of knowledge. The degree to which this offsets the relative disadvantage in cultural distinctiveness is, therefore, an empirical issue.

H_3 Diversity amongst the highly skilled matters most.

Most studies of diversity treat migrants as a single homogenous group. Few consider the economic impact of skilled or unskilled sub-populations, despite considerable differentiation between these communities at the policy level (Syrett and Sepúlveda 2011; Ram *et al* 2013). There are some exceptions. For example, Hunt and Gauthier-Loiselle (2008) and Kerr and Lincoln (2010) suggest that the presence of diverse high-skilled workers is positively associated with regional innovation. From this perspective, if we view migrants as mobile carriers of ideas, the highly skilled, in particular, may have the most to offer from an economic point of view (Nathan 2011). Skilled migrant face a reduced technology gap with respect to skilled native workers (Chiswick 2005) and face lower barriers to communication and labour market integration as a result. If the types of skills possessed by migrants are culture-specific and complementary to those of the native population, skilled migrants may be better able to tap into, utilise, and exploit new knowledge and ideas (Bresnahan *et al* 2002).

Low skilled migrants, by contrast, tend to face higher costs to communication, including cultural and linguistic barriers, and potential discrimination, which may impede labour market integration and/or curb entrepreneurial aspirations in an ‘unknown and alien social and commercial environment’ (Jones *et al* 2012: 3171). Low-skill migrants can represent substitutable labour, competing with similarly unskilled native workers, and make much more modest contributions to the regional knowledge economy compared to their skilled counterparts (Rath 2006). However, labour market marginalisation may also increase entrepreneurship, or, more specifically, self-employment pursued out of necessity in unskilled migrant communities (Saxenian 1999; Barrett, Jones & McEvoy 2003). This may be of most relevance to low-technology sectors with low barriers to entry (Ram 1993). Our analysis explores these associations by examining the relationship between diversity and entrepreneurship for representative sectors, as discussed in the next section, to analyse how any relationship varies across enterprises at varying degrees of knowledge intensity.

3 Data and estimation strategy

Our empirical analysis is conducted at regional level, utilising travel to work areas (TTWAs) as our spatial units. TTWAs represent functional economic regions, constructed using commuting data to represent areas where 75% of the resident population also work within the area, and vice versa (Bond and Coombes 2007). From an empirical perspective, the selected units and are superior to arbitrary, administrative spatial units, diminish the risks associated with the modifiable areal unit problem (Briant *et al* 2010), and allow the results to be interpreted in the context of local economies.[2] Entrepreneurs are also known to predominantly initiate new start-ups within their home labour market (Figueiredo *et al* 2002).

Cultural diversity

To test the full range of hypotheses five different types of diversity index are constructed. The first distinction made is between indices based on professed ethnicity and country of birth and are derived from the UK census in 1991 and 2001. As the ethnicity and birthplace questions are slightly different across censuses, the data are harmonised resulting in 10 ethnicity and 32 birthplace classifications used to construct the indices.[3] Moreover, due to differences in data collection methods between the constituent countries of the UK, our analysis pertains to England and Wales only. We use Theil entropy indices to measure regional diversity, constructed as follows:

[2] Where data are not available in a form that can be directly aggregated to the TTWA level – usually due to overlapping boundaries – we transform the data using a postcode-share methodology. Units that overlap TTWA boundaries are allocated a postcode share for each partition and aggregated accordingly.

[3] See online appendix for classifications.

$$Div_i = \sum_{r=1}^{Ri} \pi_{ri} \times \ln\left(\frac{1}{\pi_{ri}} \right)$$

where π_{ri} is the share of the population belonging to ethnic (or birthplace) group r in region i and R_i is the total number of different ethnic (or birthplace) groups. The index reaches a maximum value of $\ln(R_i)$ where each ethnicity (or birthplace) classification commands an equal share of the population $\pi_{ri} = 1/R_i$. The value of the indicator is zero ($\ln(1) = 0$) where local populations are ethnically homogeneous (or all UK born), i.e. $R_i = 1$.

Theil indices have several advantages over alternatives, such as Herfindahl-inspired fractionalisation indices, due to a greater sensitivity to both the distribution and 'richness' of diverse populations, and less sensitivity to large dominant groups, which can be problematic in countries like the UK with a predominantly UK-born, ethnic white population (Audretsch *et al* 2010).

The constructed indices show that diversity has increased across the board in the decade leading up to 2001. As presented in Figure 1, higher levels of diversity – indicated by darker shading – are clearly evident in key conurbations, such as London, Manchester, Birmingham, Bristol, and Cardiff. Differences are also evident between birthplace- and the ethnicity-based measures of diversity. Although the spatial distribution is broadly similar, birthplace diverse regions are generally more prevalent in the South. Ethnically diverse areas appear to be more tightly distributed around cities, and their immediate periphery, but with a more even spread towards the North. This is potentially a symptom of the strong pull of London and the Southeast for first generation migrants, particularly to areas that are established gateway regions for those new to the country. Second and subsequent generations of migrants may be more prone to disperse, owing to a better knowledge of opportunities elsewhere in the UK. Nevertheless, in general the correlations between each diversity indicator is relatively high (around 77%). However, we contend that the level of variation is sufficient to unearth the nuanced influences that each measure may have upon regional entrepreneurship.

Figure 1: Birthplace and ethnic diversity in 2001

FIGURE 1

In line with recent research that distinguishes between the size of the migrant community and it's diversity, we also decompose the index by creating one variable to measure the proportion of the workforce that is foreign-born and an additional variable to measure the diversity of this non-UK born workforce (i.e. excluding the dominant, native workers from the index - see Südekum *et al* 2009). By doing so, we can test more precisely if it is diversity or simply the share of foreign-born individuals that influence the entrepreneurial performance of UK regions. Regrettably, it is not possible to conduct the same exercise for our ethnicity-based measures due to the nature of the classifications.[4]

The second distinction made in order to test our final hypothesis is between diversity indices based upon sub-populations of high, intermediate and low skill populations (inspired by research on diversity and productivity by Südekum *et al* 2009). Skilled and unskilled workers are defined using occupational classifications (as in Brinkley *et al* 2009). Education-based measures would have been preferable, but due to data limitations, a full set of indicators could not be constructed.[5] As the occupation-based measures, by definition, discount the unemployed, full-time students, and the economically inactive, this may induce bias into the measurements for particular regions if unemployment, student numbers and inactivity unevenly distributed across space. It is also possible that the use of occupational classifications may simply reflect job preferences amongst different groups. We analyse these potential sources of bias by comparing the occupation-based indices with the limited data we have for comparable education-based measures, which do not suffer from either of these problems. Close comparisons provide little cause for concern, either in terms of differences in the indices themselves or the results they produce.

Skilled workers are defined as those employed in the top three tiers of the UK standard occupational classification scheme (SOC - managers and senior officials; professional occupations; associate professionals and technical occupations), whilst unskilled workers represent the final tier of the SOC (elementary occupations). Intermediate skilled workers comprise the remaining workforce that are neither unskilled, nor in knowledge-intensive

[4] Although it is possible to pick out the dominant ethnic-white group, a non-trivial proportion of these may also be foreign-born.

[5] It is only possible to identify highly educated inhabitants (designated as 'qualified manpower') by ethnicity in the 1991 census.

professions. In aggregate, knowledgeable, skilled workers make up 36.9% of the total workforce, whilst unskilled workers constitute 9.3%.

Entrepreneurship

Entrepreneurship is measured using data on annual business registration rates from 1994-2007. In Britain, it is a requirement for businesses with an annual turnover that exceeds a set threshold (£52,000/yr for 2001) to register for value-added tax (VAT). To moderate any stochastic variation in the time-series data we divide the data and take averages over the period 1994-2000 and 2001-2007 to refer to the census base years 1991 and 2001, respectively. The data are standardised using the regions working age population to yield start-up intensities (start-ups per 10,000 inhabitants). This approach is common to labour-market analysis and contrasts with the alternative ecological approach, which standardises by the stock of businesses. The alternative approach, whilst in keeping with the KSTEs emphasis on the role of knowledge spillovers from firm R&D investments, is deemed less suitable for our purposes, due to our focus on the characteristics of the local population. As is customary in the literature, we remove start-up data for public sector and agricultural firms from the dataset.

VAT registration data has several advantages over alternatives, like self-employment rates, which have been demonstrated to be imperfect proxies for regional entrepreneurship (Faggio and Silva 2012). Self-employment data includes non-entrepreneurial workers, such as sub-contractors and other forms of technically self-employed individuals that undertake activities analogous to paid employees, as well as low-level self-employment activities. VAT registration has the added benefit of excluding phantom businesses that are devoid of any real economic activity. However, as VAT registration is required only once a business reaches a threshold level of turnover, it partially represents instances of successful entrepreneurship. Nascent firms may take several years to reach the threshold level of turnover. However, as this threshold is relatively low, many start-ups will register for VAT at a very early stage.[6] It is also an incomplete measure, with around half of all UK businesses

[6] The BERR Annual Small Business Survey 2006/07 evidenced that 11 per cent of start-ups registered for VAT prior to start-up, two thirds within 6 months, and a small fraction 2 years or more after starting up.

VAT registered. Nevertheless, the data represent the most comprehensively available and spatially consistent for use at the TTWA level.

General start-up intensities follow similar spatial distributions to regional diversity. Higher intensities are most prevalent around cities, in the Southeast, and London in particular. To test for differences across sectors, we construct sector-specific entrepreneurship measures using the top-tier of the 2003 UK Standard Industrial Classification (SIC) scheme for hotels and restaurants (SIC H) and financial intermediation and real estate, renting and business activities (SICs J&K). The two sectors are selected to represent the most knowledge-intensive start-ups (SICs J&K) and low-barrier to entry start-ups (SIC H). Approximately 35% of the workforce in SIC J&K have degree-level qualifications compared to 9% in SIC H. Moreover, the geographies of each sector-specific measure are highly differentiated. Start-ups in SIC J&K are tightly clustered around cities and urban agglomerations, whereas in SIC H start-ups tend to be more idiosyncratically distributed, with many cities strongly represented alongside coastal cities and touristic areas of the UK. Ideally we would have liked to be more precise in the sector selections, by picking out a range of knowledge-intensive and low-barriers to entry sectors, but the selected classifications represent the best options permitted by the data.

Controls

Drawing on developments in entrepreneurship theory, we assemble a set of independent variables to control for confounding factors (see Acs and Armington 2006 for a review). All controls are constructed for the two base-year periods of 1991 and 2001.[7]

First, the share of highly qualified workers is utilised to proxy for the knowledge embodied in a region's *human capital* stock. This is defined as the proportion of the working age population with at least degree-level qualifications.

The relationship between regional *unemployment, incomes,* and entrepreneurship is theoretically ambiguous. Higher unemployment rates are generally a problem, but can positively influence entrepreneurship by pushing individuals into self-employment out of

[7] See the online appendix for a table outlining the full set of variables.

necessity. High incomes provide potential entrepreneurs with the necessary start-up capital to get a nascent business off the ground, whereas low incomes diminish the perceived risk of self-employment, thereby pushing individuals into entrepreneurship out of necessity.

Regarding diversity, existing empirical evidence seems to suggest that a diversified industrial profile is negatively associated with new business formation rates (Audretsch *et al* 2010). Thus we test to see if Jacobian or Marshallian externalities prevail for entrepreneurship in a British setting. The industrial diversity indicator is also constructed using a Theil index.

Urbanisation has also been linked to entrepreneurship. Key conurbations exhibit the highest start-up intensities. They characteristically contain high proportions of 'early career' individuals and are regarded as 'nursery cities' or proving grounds for emerging talent that may be important for entrepreneurship (Duranton and Puga 2000). Densely populated agglomerations are moreover associated with higher productivity and innovation, driven by increased probability of interactions between geographically proximate individuals (Ciccone and Hall 1996). High density also provides opportunities for businesses that require a critical mass of skills, suppliers, and demand. Thus, *population density* is employed as a control for agglomeration economies, measured simply as the number of inhabitants per square kilometre. We also include *population growth*, to similarly control for start-ups that are born to serve an expanding population.

Empirical studies also tend to suggest that new entrepreneurs are often young. Entrepreneurship rates peak between 20 and 45 years of *age* (Glaeser and Kerr 2009). However, research is conflicting in this respect (Bönte *et al* 2009). We therefore control for the proportion of individuals in the *age* band 20-44.

Finally, we also control for the rate of *homeownership*. Research in the US suggests that homeownership is positively correlated with business creation rates (Fairlie 2013). Homeownership can provide a source of equity or capital to pursue entrepreneurial endeavours. However, homeownership may also alter a homeowner's tolerance for risk in such a way that it diminishes the willingness to start a new firm.

Basic model

We apply the KSTE framework to examine the impact of cultural diversity, in its various forms, on business start-up intensities in English and Welsh regions. The basic econometric expression adopts the following form:

(1) $$Ent = \alpha + \beta Div + \gamma Con + \tau + v$$

where α is a constant term and Ent is a vector of business start-up intensity across each TTWA. Div represents the objective cultural diversity index. Con is a vector of controls consistent with the extant literature, τ is a time dummy, and v denotes an IID error process[8].

Spatial econometric estimation strategy

Spatial autocorrelation is recognised as a key consideration in entrepreneurship research (Breitenecker and Harms 2010), and, where present, can render OLS results inefficient (Anselin 1988). We perform spatial diagnostic tests – Moran and Lagrange LM tests – to test for the presence of spatial autocorrelation and for the selection of an appropriate model. In order to carry out the specification tests, an appropriate spatial weights (W) structure must also be selected. The weights structures can be constructed in several ways, for example, first-order contiguity, k-nearest-neighbours, or the use of a distance threshold (neighbours defined as all regions within 100km of the object region), among others. First-order contiguity matrices are applied in this study. Two alternatives – 5-nearest neighbours and a distance threshold of 100km – are utilised for robustness diagnostics. Given the functional nature and size of TTWAs spatial dependence is expected to be limited to immediate neighbouring regions.

Where spatial autocorrelation is detected, appropriate spatial modelling techniques are utilised following the general-to-specific spatial modelling approach (LeSage and Pace 2009;

[8] In addition to linear OLS regressions, quantile regressions are employed to provide an indication of the stability of the relationship between entrepreneurship and diversity for different levels of entrepreneurship. The results for overall levels of diversity are largely stable and available upon request.

Elhorst 2010). We start by estimating a spatial-Durbin model (SDM) in panel form[9], as follows:

SDM: $Ent = \alpha + \rho WEnt + \beta Div + \gamma Con + \beta' WDiv + \gamma' WCon + \tau + v$

SDM takes into account two of the three different interaction effects, as outlined by Manski (1993), for explaining spatial patterns in economic phenomena; an endogenous interaction effect, an exogenous interaction effect, and an auto-correlated error effect. The SDM nests both the spatial error (SEM) and spatial lag (SAR) models. The SEM model specifies that the nature of the dependence is between the error terms, i.e. spatially clustered omitted or immeasurable factors. The SAR model assumes that the form of spatial correlation is through a process of simultaneous feedback between entrepreneurship intensities in each region and its neighbours. Using the SDM as a starting point, we assess if the model can be simplified by testing sets of restrictions. The SDM becomes a SEM where $\beta + \rho\beta = \gamma' + \rho\gamma = 0$ and simplifies to a SAR model where $\beta = \gamma' = 0$.

SEM: $$Ent = \alpha + \beta Div + \gamma Con + \tau + v$$
$$v = \lambda Wv + u$$

SAR: $Ent = \alpha + \rho WEnt + \beta Div + \gamma Con + \tau + v$

We test these two restrictions to settle on the appropriate estimation technique. However, even where the true data generating process is SAR or SEM, the SDM will return unbiased estimation results, the excluded effect, a spatially auto-correlated error term, only causes a loss of efficiency and does not bias or threaten the consistency of results (LeSage & Pace 2009).

Instrumental variables strategy

We implement an instrumental variables approach as an additional robustness measure. IVs are used to address the common concern of endogeneity in diversity research. The validity of the analysis relies on the causal influence of cultural diversity, driven by ethnic and cultural migration, as a determinant of regional start-up intensities. However the plausibility of this claim can be questioned on the grounds that the direction of causality is ambiguous.

[9] Utilising the state routine 'xsmle'

If migrants choose their destination according to its local entrepreneurial culture, areas with higher start-up rates at the outset could attract the more talented and entrepreneurially predisposed, mutually reinforcing the relationship. The instrument used need to be correlated with contemporary diversity, but not also belong in the explanatory equation. We contend that a classic Card (2001) inspired 'shift-share' instrument is appropriate for this purpose. Using the composition of diversity within each TTWA in 1991, and the national level growth in each birthplace or ethnic group over the intervening period, we create a predicted index of diversity for 2001. These variables are highly correlated with 2001 diversity measures and unlikely affected by reverse causation. As there was no ethnicity question in the 1981 census, we are unable to predict a diversity index for 1991, thus, the IV specification is carried out for the 2001 cross-section only.

4 Results and discussion

OLS specification

The point of departure for the analysis of cultural diversity and entrepreneurship is the basic pooled OLS model. As heterogeneity is an issue in our initial specification, we take natural logarithms of the entrepreneurship, diversity, industrial diversity, income, and population density variables for all presented estimations. As presented in Table 1, the pooled OLS models provide early support for our first hypothesis. All diversity indices are significant with a positive sign, suggesting that cultural diversity is associated with higher rates of entrepreneurship. Even controlling for the share of the foreign-born workforce, the diversity of the foreign population is strongly significant (Column 4). With respect to our third hypothesis, larger coefficients are associated with higher skilled, diverse populations (Column 6).

The first column of Table 1 includes the full sets of regressors, but does not take into account spatial spillovers. However, potential entrepreneurs located in a region bordering, say, London are likely be subject to different influences than a region with rural neighbours. The second column adds spatially lagged regressors to the estimation to include the effect of the areal averages of each. The remaining columns include both spatially lagged regressors and a spatially lagged dependent variable. Despite some relatively high (above 0.5) correlations between the regressors, multicollinearity is not a serious problem, as indicated by variance inflation factors (VIFs) tests. Expanding the set of regressors to include spatial lags heightens the risks of multicollinearity and may inflate the standard errors of the affected variables. However, in all cases, VIF statistics for the diversity variables suggest that multicollinearity is not a problem for the key variables of interest. Some caution, however, should be taken with the income and population density controls where spatial lags are included.[10]

TABLE 1

Controls

The share of highly qualified human capital is positively associated with regional entrepreneurship, consistent with many studies examining economic phenomena in a regional setting. Human capital forms a core component of the KSTE framework, and suggests that knowledge embodied in highly skilled workers forms the basis for facilitating knowledge spillovers and, as our results show, boosting entrepreneurship.

Theoretically, the impacts of unemployment and income levels are an empirical concern, due to their potentially ambiguous effects. Our results indicate that higher incomes and low unemployment rates are correlated with diversity. This may mean that for both factors, opportunistic forms of entrepreneurship, born out of a desire to commercialise a new business opportunity, exceed necessity-based self-employment.

Industrial diversity and population growth are all positively associated with higher rates of new firm formation. Population density is also positively associated with general entrepreneurship rates, but is often statistically insignificant. This suggests that regions that are industrially diverse with rising populations, often by attracting domestic and international migrants, provide more opportunities for knowledge spillovers, generate higher levels of consumer demand, both benefitting regional entrepreneurship.

[10] Further robustness checks were carried out, including removing some of the more problematic variables with respect to multicollinearity. Despite a reduction in the explanatory power (R^2) of the models, the omission of variables, such as incomes or unemployment rates, did not affect the main indicators of interest significantly.

The share of the regional population between 20 and 45 is negatively associated with entrepreneurship intensities, contrasting with several studies in the literature. In addition, the coefficients for homeownership are, in most instances, statistically insignificant and change sign. These findings imply several possibilities. In both cases the relationships are potentially complex. For age, there may be a non-linear, u-shaped relationship, or, similar to our current hypotheses, a diversity of ages may matter. In terms of home ownership, whilst owning a home can provide a source of equity to secure business loans, it can also alter an individual's tolerance for risk.

Spatial models

Spatial diagnostic tests uncover spatial non-randomness in the data. To address the spatial nature of the data we follow a general-to-specific spatial modelling approach, and implement spatial Durbin (SDM) models as our point of departure. Columns 4, 8, and 10 of table 1 present the results for the spatial models across each diversity measure. We test restrictions to ascertain if a spatial error or spatial lag specification better describes the spatial interaction process. In both instances, the restrictions are rejected, suggesting that SDM is the optimal modelling approach. Moreover, the Akaike information criterion (AIC) suggests that the SDM model better represents the data generation process in comparison with the SEM and SAR approaches. However, we also modelled using SEM and SAR to see how robust the results are to the changes in specification, all providing relatively consistent results.

The spatial models tend to confirm the OLS results. All measures of diversity return a positive sign and are statistically significant, with the exception of our measure of high-skill diversity with the SDM (Column 11 - however, when modelling using SEM and SAR, high-skill ethnic diversity is both positive and statistically significant). Like before with the OLS results, the magnitudes of the skill-based measures of diversity progressively increase for higher skill groups. The signs and significance of the controls are also broadly in line with the OLS models.

IV specification

The results of addressing the potential endogeneity in the association between diversity and entrepreneurship are presented in Table 2. They confirm that endogeneity of the diversity measures is not a major problem. Each diversity indicator is instrumented using an equivalent shift-share indicator of predicted diversity, for both the main regional diversity variable and its spatial lag. The instruments pass tests for weak and under identification.[11] Despite some differences with respect to the OLS and spatial models, the key hypotheses of this research are reinforced by the IV results. The controls remain largely consistent with the OLS and spatial specifications. Thus, we conclude that the use of the Card-inspired shift-share indicates that our results are robust and that diversity yields greater levels of entrepreneurial activity.

TABLE 2

Although birthplace diversity is only weakly significant (Column 1), when we control for the size of the foreign-workforce and its diversity simultaneously, we can see that both are positively associated with entrepreneurship, with strong statistical significance (Column 2). The IV results also tend to suggest that it is diversity between highly skilled workers that matters the most (Column 4). For the skill-based measures of diversity, the same increasing pattern is evident for higher skill groups, but with magnified magnitudes, while the low-skill index becomes statistically insignificant.

Different types of entrepreneurship

In keeping with recent studies of the determinants of entrepreneurship, we substitute the general measure of entrepreneurship with three alternative, sector-specific measures. Table 3 presents the full set of diversity coefficients for each modelling approach – OLS, spatial, and IV – and each sector-specific entrepreneurship indicator.

[11] We also tried an alternative instrument based on a regions distance from `migrant gateway's' into the UK, consisting of the major entry points such as international airports, rail and sea ports (typically used in the US – see Ottaviano and Peri 2006). This type of instrument proves very weak in the UK context due to the country's geography and large number of entry locations (Nathan 2011). However, with it we are able to specify an overidentified model and test for the validity of at least one of the instruments (i.e. that they are uncorrelated with the error term), which our models pass.

TABLE 3

We analyse hotel and restaurant start-ups (SIC H) to shed some light on the associations between our diversity measures and sectors with relatively low barriers to entry. In this instance, the headline diversity measures prove insignificant. When controlling for the both share of the foreign-born population and its diversity, only the former is statistically significant. This suggests that for regions with higher shares of migrants, labour market marginalisation may be the more significant issue, potentially forcing individuals into entrepreneurship out of necessity due to blocked access to labour markets, and is accordingly unrelated to our knowledge-based arguments. When we analyse the skills-based indices, the general pattern observed for all start-ups is essentially reversed. Low-skill diversity proves positive and statistically significant, contrasting with the high-skill diversity indicator, which is negative and significant. In combination with the result on the foreign-born population share, this suggests that entrepreneurship in sectors with low barriers to entry may represent an important means for low-skill migrants to enter the labour market, especially where enterprises are linked to growing culture-specific demands (such as ethnic foodstuffs and cuisines, among others). Whilst positive from an entrepreneurship point of view, for an economic perspective these types of firms are unlikely to generate significant employment or contribute to the aggregate development of the region. In the case of the IV results, the pattern remains, but each measure of diversity is statistically insignificant.

The second sector we analyse constitutes a combination of financial intermediation (SIC J) and real estate, renting, and business services (SIC K) start-ups, which represents the best available proxy for knowledge-intensive entrepreneurship in our data. The selection of the sector gets closest to the spirit of the KSTE framework and the Jacobs diversity argument, as entrepreneurship in this sector is most likely to be influenced by the local knowledge environment. As previous studies have highlighted, it is for knowledge-intensive start-ups that the diversity dividend is strongest. Our results confirm these findings for the UK.

The full set of diversity coefficients also provides the strongest endorsement for all three of our hypotheses. First, it is clear that diversity matters for knowledge-intensive entrepreneurship. Even controlling for the share of the foreign-born population in each region, the diversity of foreign migrants is positive and strongly statistically significant.

Second, birthplace diverse regions appear to be more closely associated with entrepreneurship than ethnically diverse regions for knowledge intensive start-ups. For the OLS and SDM estimates, birthplace diversity is strongly statistically significant, whereas ethnic diversity only achieves weak significance in the SDM. For the IV results, however, both headline indicators are insignificant until we control for the share of foreign-born migrants, when the indicator of birthplace diversity becomes highly significant. Third, the data for knowledge-intensive start-ups strongly suggests that it is through diverse skilled workers that the diversity dividend is manifested. Diversity amongst the highly skilled achieves statistical significance across all modelling approaches. Our findings draw similarities in studies of regional innovation (Niebuhr 2010), which posits that promoting diverse interactions amongst skilled, knowledgeable workers is an important key conduit for knowledge spillovers, innovation, and ultimately, knowledge-intensive entrepreneurship.

5 Conclusions

More than demonstrating the importance of cultural diversity for entrepreneurship in English and Welsh labour markets, this research shows that the type of cultural diversity measured is a decisive factor. By comparing birthplace and ethnic diversity measures across different forms of entrepreneurship, this paper finds that both measures are clearly linked, but that in the case of knowledge-intensive entrepreneurship, birthplace diversity prevails. In accordance with our hypotheses, new migrants born outside the UK provide a greater boon to a regions knowledge stock and, thus, for more business opportunities to be identified and realised, although both are likely important.

The diversity amongst the ranks of the highly skilled – those employed in knowledge intensive occupations - exerts the strongest impact upon start-up intensities. This result is in accordance with our primary supposition, that highly skilled workers, endowed with culture-specific talents and backgrounds, are of special importance for entrepreneurship. Our results prove robust across various specifications, including spatial modelling and IV-based estimation strategies. The latter suggest that causality runs from diversity to entrepreneurship.

From a policy point of view, our study raises a number of important policy concerns. First, diversity breeds entrepreneurship. But more than ethnic diversity – represented by individuals from different ethnic origins, but who, by and large, tend to share the same background education and culture – it is the diversity of birthplace groups that it the primary driver of entrepreneurship. Recent migrants from different origins, rather than the descendants of past migrants, create the conditions for a more dynamic entrepreneurial environment. This effect is most clearly substantiated in terms of knowledge-intensive start-ups. In this respect, recent legislation by the UK Home Office to restrict migration is likely to lead to a serious dent in entrepreneurship, affecting, in turn, the potential for employment generation and economic growth. Second, our results underline that, at least in the short-term, any restrictions associated with the entry of highly skilled migrants will potentially have negative economic consequences in terms of entrepreneurship. If Britain is to enhance its status as a country open for business, the attraction of highly skilled migrants from around the world is the best bet to turn this from a mere slogan into reality.

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