**Positive local externalities of immigration on entrepreneurship:**

**evidence from the UK East Midlands region**

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**Abstract** *This article examines the effects immigration on entrepreneurship, making a distinction between the individual level and the neighbourhood characteristics. The study combined individual level data drawn from the Global Entrepreneurship Monitor database with neighbourhood level data for the English Index of Multiple Deprivation (IMD) East Midlands region in the UK and applied a maximum likelihood logit model to test the hypotheses. The empirical evidence suggests that there is no direct link between the internal immigrants and start-ups on the one side, yet, there is direct link between the external immigrants and start-ups on the other side. However, the findings points to the importance of indirect effect neighbourhood characteristics as external immigrants have a significant effect on an individual’s perception of new entrepreneurial opportunities which predicts start up activity. Their presence in the neighbourhood has a positive monotonic effect on individual entrepreneurship. Therefore, the critical factor is not that external immigrants come with unique knowledge and skills they utilise in the creation of their own businesses, instead they produce positive local externalities enabling others to start-up businesses.*

**Keywords** Migration, Entrepreneurship, Diversity, Neighbourhood, East Midlands, United Kingdom, Global Entrepreneurship Monitor

# Introduction

Extant studies clearly show significant and persistent regional variations in entrepreneurship that exceeds national differences (Bosma and Schutjens, 2011; Herrington and Kew, 2017; Levie and Hart, 2010). These high variations apply to observed entrepreneurship rates regardless of whether they are measured by the rate of established businesses or early stage entrepreneurship. Levie and Hart (2010) revealed that there are pronounced variations on the prevalence rate of nascent, young and established businesses across the regions. They have also shown that at the individual level, entrepreneurial attitude captured by the perception of start-up opportunities, knowledge and skills required in starting a business and fear of failure differs widely between regions. These findings inspired scholars and practitioners to investigate the regional determinants of entrepreneurship. For example, studies have revealed the importance of regional knowledge creation for start-up (Audretsch and Keilbach, 2007b; Florida, 2004; Lee et al., 2004). Other studies have shown that the share of immigrants in the region has a positive effect on new venture creation characteristics (Clark et al., 2016; Peroni et al., 2016; Rodríguez-Pose and Hardy, 2015).

While this study acknowledges that these studies greatly advanced our understanding about regional determinants of entrepreneurship, they did not provide sufficient information about the mechanisms through which regional characteristics affect individual entrepreneurship. However, regional characteristics might not have a significant direct effect on entrepreneurship but they may operate in conjunction with an individual’s attitude (Stuetzer et al., 2014; Tamasy, 2006; Wagner and Sternberg, 2004). Therefore, the argument here is that the relationship between immigration and entrepreneurship is not straightforward and in order to understand it, one needs to consider culture and attitudes. Focusing on attitudes may help us to identify the potential causal mechanisms and why immigrants are more entrepreneurial than natives and why(how) their presence in the neighbourhood affects entrepreneurship in the local area. This is consistent with prior studies that argue that areas that absorb large in-flows of immigration also gain in social diversity, which is an important factor in enhancing local entrepreneurship (Florida, 2004; Jacobs, 1961; Rodríguez-Pose and Hardy, 2015). This study takes a different approach to that considered by Mickiewicz, et al., (2017) and Florida (2004). We may gain a better understanding about how neighbourhood characteristics affect entrepreneurial behaviour by combining aggregated data at Lower Super Output Area (LSOA) with individual level data. A small number of studies have utilised this method and they provided empirical evidence that indicates the importance of regional characteristics in explaining individual attitude and actual engagement in entrepreneurship (Audretsch and Belitski, 2013; Audretsch et al., 2010; Stuetzer, et al., 2014).

 Combining all the arguments presented above, the aim of this study is to examine the effect of immigration on entrepreneurship focusing more on an individual’s perceived start-up opportunities as an intervening factor (Davidsson, 2015). Moreover, integrating an individual level variable perceived start-up opportunities in the conceptual model of neighbourhood entrepreneurship require making a distinction between the indirect and direct effects of neighbourhood characteristics. Therefore, to test the direct effect of immigration on entrepreneurship, the focus is on the effects of a share of internal and external immigrants in the neighbourhood on individual entrepreneurship. In examining the process of how the effect of neighbourhood characteristics trickles down towards an individual, the study follow Sternberg and Rocha’s (2007) approach and focus on an individual perception of the neighbourhood characteristics. It is assumed that this perception may shape an individual’s attitude towards entrepreneurship.

The empirical evidence provided in this study is based on the 2006 to 2009 GEM survey data combined with IMD 2007 dataset. The study applied a maximum likelihood logit as an estimator which is enhanced by fixed effects corresponding to LSOA. The study makes significant contributions to the literature in three ways. First, integrating individual and neighbourhood level variables in a single conceptual framework enabled to solve some the ambiguities confounding the literature. Here, the study contributes to the emerging literature on entrepreneurship that supports the social diversity argument and argues that it is about people and not occupations or firms (Audretsch, et al., 2010; Jacobs, 1961; Mickiewicz, et al., 2017).

 Second, the study contribute to knowledge by testing the empirical reach of the place-based theory of entrepreneurship at a sub-regional level, the neighbourhood level, which until now has been overlooked in quantitative research (see Bosma, 2009; Mickiewicz, et al., 2017). This become more disheartening when considering the stress on neighbourhoods in explaining entrepreneurship which can be traced back to Jacobs (1969). Third, provides results that suggest that the indirect rather than the direct effects of neighbourhood characteristics are more important for entrepreneurship within the context of immigration. It argues that the critical factor of local entrepreneurship is not just that external immigrants come with unique knowledge and skills that they utilise in their own newly created businesses, but equally that they produce positive local externalities which increases the chances of others to start new businesses. In the interpretation of direct and indirect effects, we see the two effects as operating through increased diversity, in so doing, the study build directly on Jacobs (1969) and Florida (2004).

The remainder of this study is structured as follows. The following section considers the importance of population diversity from an entrepreneurial and economic point of view and presents the hypotheses. The next section introduces the databases used and a description of the estimation strategy. Following that, the results of the logit regressions corresponding to the formal tests of the hypotheses are presented. Finally, concludes by providing a discussion and policy implications.

# Theoretical background and hypotheses development

## The direct effect of immigration on start-ups

Factors that can attract immigrants into entrepreneurship can be classified under two groups; push and pull factors. Simões, Crespo and Moreira (2016) discusses some of the push factors that may force immigrants to engage in entrepreneurial activities. These push factors include both formal and informal barriers which block employment opportunities for many immigrants resulting in many of them being pushed into self-employment. Formal barriers might include regulatory controls such as not having the legal right to work or none validation of foreign educational qualifications that blight immigrants. In the former case, engagement in entrepreneurial activity remains the only viable option as it enables immigrants to avoid detection by the authorities (Parker, 2009). Whereas, informal barriers that may limit immigrants’ employment choices may include unfamiliriarity with the local environment often confounded by poor laguage skills and discrimination based on cultural characteristics (Aldén and Hammarstedt, 2016; Bolívar-Cruz et al., 2014). This implies that some immigrants may engage in entrepreneurial activity as a means of economic survival due to mismatch between their qualifications and jobs (Basu, 2006; Levie, 2007; Simões, et al., 2016).

In addition, extant literature suggest that there may be a link between immigration and the identification of entrepreneurial opportunities (Fairlie and Lofstrom, 2015; Parker, 2009; Simões, et al., 2016). The decision to migrate may be considered as an entrepreneurial decision since it requires a higher degree of risk taking. Moreover, it is based on expected economic rewards gained from moving to other regions or countries under conditions of limited knowledge and uncertainty. Immigrants are a self-selected group, more willing to take risk and confront failures than the indigenous people as evidenced by the decision to emigrate which is often considered to be risky (Festinger, 1957; Neville et al., 2014; Parker, 2009). This was supported by Levie (2007) who provided evidence which indicates that in the UK, immigrants as being more risk tolerant than the indigenous residents.

Although immigrants might be more alert as suggested by Kirzner (1973), before migrating to another country, their capacity to spot new entrepreneurial opportunities may increase even further as a result of immigration. Immigrants, having come from elsewhere, see the world differently because of their involvement in dual cultures and a radically different prior experience compared to non-immigrants (Basu, 2006; Bolívar-Cruz, et al., 2014). In this case, their search space is enlarged which enables them to spot a wide range of opportunities which are not visible to non-migrants in their local area (Basu, 2006; Bolívar-Cruz, et al., 2014; Carlsson and Jacobson, 1997). Therefore, it is expected that immigrants may come with a different pool of knowledge and worldviews that may give them a comparative advantage in opportunity recognition.

The argument about immigration as a mechanism that determines the propensity for entrepreneurial behaviour does not only apply to external immigrants who move from their home country to settle in another country but may also be applied to internal immigrants - individuals within national boundaries. Although there is less risk involved in internal migration, however, it is an indicator of alertness and willingness to confront uncertainty. Thus, an individual might have been dissatisfied with his/her current work and life situations and might have identified an opportunity for personal development outside the boundaries of his/her region. Therefore, internal immigrants come with a different set of knowledge and experience than that possessed by indigenous residents. Such differences imply that internal immigrants can identify entrepreneurial opportunities in their local community which are invisible to individuals who do not possess these characteristics. Taken together, the following hypothesis is proposed:

***Hypothesis 1:*** *Individual internal and external immigrants are characterised by higher likelihood to engage in start-up activities.*

## Neighbourhood effects of immigration on start-ups

The central point of the creative class thesis is the creation of opportunity-related knowledge (Florida, 2004). However, that depends on the composition of neighbourhood population and creativity of people, that is, if they are able to combine the existing knowledge with new knowledge to generate new entrepreneurial specific knowledge (Florida, 2004, 2011). According to this school of thought, a large and diverse regional knowledge base, characterised by differences in backgrounds, skills, capabilities and experiences is considered as a major condition for higher start-up rates. Immigrants come with new knowledge that they can commercially exploit through the creation of new business. However, this knowledge may also be commercially exploited by others through starting new businesses. Some empirical studies provided evidence that indicate that immigrants as a group proportionately create more new firms than the indigenous residents (Levie and Hart, 2013; Mickiewicz, et al., 2017; Rodríguez-Pose and Hardy, 2015). However, others find no support for this proposition (Hansen and Niedomysl, 2009; Stuetzer, et al., 2014).

However, the conflicting empirical findings may relate to not being able to make a distinction between the individual level and neighbourhood level effect of immigration, and considering the displacement effects caused by immigration. Indeed, arguments concerning Jacobs (1969) externalities can be applied to the spill-over effects resulting from the presence of immigrants. According to Jacobs (1969), greater diversity within a neighbourhood facilitates in the spill over process of knowledge which ultimately induce more agents to engage in start-up activity (see Mickiewicz, et al., 2017; Stuetzer, et al., 2014) It is assumed that differences among people enable them to evaluate new idea differently leading economic agents to react to different new business ideas in a diverse way. In other words, emphasis should be on the assessment of new business ideas by different people with different backgrounds, capabilities and experiences. This leads to divergent evaluations and value of business opportunities that induce economic agents to engage in start-up activities to commercially exploit the new opportunities and appropriate the value of their knowledge.

The novel element stressed in this study is that the opportunity to draw from the local environment is critical for both internal and external immigrants. Therefore, it is expected that a high share of the internal and external immigrant population in the neighbourhood, indicating a larger knowledge creation base within the local community, has a positive effect on propensity to engage in entrepreneurial activities. Taken together, the following hypothesis is proposed:

***Hypothesis 2:*** *A high share of internal and external immigrants in the neighbourhood, indicating a large knowledge creation base, is more likely to have a positive effect on the likelihood of engaging in entrepreneurial activity*.

## Indirect effects of immigration on an individual’s entrepreneurship

In examining how the effects of neighbourhood characteristics trickles down towards an individual, this study builds on the model proposed by Sternberg and Rocha (2007) which focuses on an individual’s perception of the regional environment. It is assumed that this perception shapes an individual’s attitude that may trigger an individual’s entrepreneurial behaviour. Following this line of thinking, neighbourhood characteristics might have an indirect effect on entrepreneurship. In this study opportunity perception is defined as an individual’s assessment of the local environment’s conduciveness for economic activity.

This perspective suggest that an individual’s perception of entrepreneurial opportunities as the main variable that motivates and trigger entrepreneurial activity (see Shane et al., 2003; Stuetzer, et al., 2014). Moreover, opportunity perception may facilitate in generating entrepreneurial intentions that may result in individuals engaging in start-up activities. Other scholars argue that opportunity perception is a measure of attitude that underpins intentions which leads to entrepreneurial behaviour (e.g. Bosma and Schutjens, 2011; Fishbein and Ajzen, 2011; Stuetzer, et al., 2014). In this study, the focus is on new entrepreneurial opportunities perceived within the neighbourhood. However, it is worth noting that because of the cross sectional nature of the GEM data, it was not possible to empirically model the relationship between immigration and perception of new opportunities as a cause and effect in our analysis. Therefore, in this study, the share of internal immigrants and external immigrants are treated as neighbourhood characteristics that shape an individual’s perception of entrepreneurial opportunities.

In addition, new entrepreneurial specific knowledge created by other people might have a significant impact on how other individual’s perceive entrepreneurial opportunities. It is assumed that the creative class as a group, in this case immigrants, play an important role in the process of generating new knowledge by combining existing knowledge with new knowledge to create new business ideas (Florida, 2004; Lee, et al., 2004). However, this new knowledge may not be commercially exploited by immigrants but can spill over to other people. The mechanisms which underpins the creation of knowledge and how it spills over to other economic agents as new business opportunities, is one of the main pillars of The Theory of Knowledge Spill-over of Entrepreneurship introduced by Audretsch and Keilbach (2007b). Accordingly, it is expected that a high share of the internal and external immigrants in the neighbourhood might generate more new entrepreneurial specific knowledge in the community which stimulates other people’s opportunity perception.

Moreover the internal and external immigrants within the neighbourhood may contribute to the knowledge spill-over process (Audretsch, et al., 2010; Jacobs, 1969; Lee, et al., 2004). The literature concerning the knowledge spill-over suggests that some components of tacit knowledge do not travel well in space; therefore, transmission requires face to face contact (Acs et al., 2013; Feldman and Audretsch, 1999; Gertler, 2003). Since these interactions takes place within the local social networks, the presents of immigrants in the neighbourhood can stimulate individual entrepreneurial opportunity perception. In this case, immigrants may not only have a rich pool of knowledge and ideas but also come with a potential to produce positive local externalities which may be commercially exploited by others within the local community through venture creation. Following this line of thought, regions or neighbourhoods endowed with higher diverse population may be able to generate positive local externalities of immigration which facilitate other people in the neighbourhood to start new businesses. The arguments stated above leads to the following hypotheses:

**Hypothesis 3:** *A high**share of the internal and external immigrants in the neighbourhood is more likely to increase the likelihood to perceive new entrepreneurial opportunities*.

**Hypothesis 4:** *Perceived start-up opportunities is associated with a higher likelihood of individuals to engage in start-up activities*

# Datasets and Methods

The data is drawn from two large databases combined: the IMD and the 2006 to 2009 pooled GEM East Midlands region databases. The GEM data consists of random samples, stratified by region, of individuals between the working ages of 16 to 64 years. This data was compiled through telephone surveys using a random digit dialling techniques by a professional marketing company (Bosma et al., 2012). After accounting for missing data in all the variables used, the sample size varied from 8,302 to 8,346 usable cases (see Table 4). The overall IMD scores for the 2,732 East Midlands region LSOA where employed to measure the individuals level of socio-economic development. On this overall measure, a LSOA with a rank of 1 is the most deprived and a rank of 3,2482 denotes the least deprived. In this study an LSOA is defined as an area which has an average population of 1,500 people. Using the Geo-Convert facility, each respondent was then classified into his/her LSOA based on their postcode data. This enabled to rank each respondent according to his/her community’s level of socio-economic development.

## Individual level variables: dependent and predictors

Entrepreneurship is considered as a heterogeneous phenomenon (Audretsch and Belitski, 2013; Minniti and Lévesque, 2010; Parker, 2009). New business start-ups are widely used as the an indicator of entrepreneurship and has been defined as the number of new businesses being created by entrepreneurs (Bosma, et al., 2012). It has already been used in immigration and entrepreneurship studies (Bolívar-Cruz, et al., 2014; Levie and Hart, 2013; Mickiewicz, et al., 2017). The number of new venture creation is used as a proxy for the quantity of entrepreneurial activity (Bosma, et al., 2012).

 [Table 1a]

Table 1a provides the description of the individual variables used in the analysis. Rabe-Hesketh et al. (2005) suggested that when employing multilevel analysis, the dependent variables should be at a lower level. Accordingly, the dependent variables – *Start-ups* and *Perceived start-up opportunities* are measured at a LSOA level. The interest is on individual entrepreneurship, in particular engagement in start-up activity. Start-up activity denotes a concrete behaviour and the individuals involved are often labelled as nascent entrepreneurs. This study employed the standard GEM definition of nascent entrepreneurs as individuals who have taken some action in creating a new business in the past year, expect to own a share of the new business and must not have paid any salaries and wages for more than three months (Bosma, et al., 2012).

In the conceptual framework, individual opportunity perception within the neighbourhood was regarded as an important proximal predictor of individual’s entrepreneurship. This variable was measured with a GEM question about whether or not the respondents perceived good opportunities to start a new firmin the community where they live in the following sixth months (Reynolds et al., 2005). In the specifications, the study includes two categories of immigrants to test Hypothesis 1 presented in the theoretical section above. The immigrant variables were created based on a question included in the GEM East Midlands questionnaire. The question was designed to discover an individual's country of birth. At the same time, for the immigrant group, the variable immigrant was coded as 1 if he/she was not an immigrant, 2 if he/she was an internal immigrant and 3 if he/she was born in any country outside the UK. At the same time, an external immigrant was defined using a dummy variable for which the value of one denotes individuals born in countries outside the UK (Levie and Hart, 2013; Mickiewicz, et al., 2017). In turn, internal immigrants[[2]](#footnote-2) refers to individuals “who re-located home from another region of the UK” (Levie, 2007: 143) and were born either in Wales, Scotland or Northern Ireland.

Following the empirical literature on entrepreneurship, age, gender, household income, education, employment status, knowledge and skills, knowing other entrepreneurs, business ownership, region and whether an individual has shut down a business in past 12 months and the number of years living in the region have all been shown to affect an individual’s probability to engage in start-up activity (Levie and Hart, 2013; Parker, 2009; Simões, et al., 2016). Moreover, these variables are more likely to be associated with migration status, therefore, need to control for them to enable isolating the independent effects of immigration on the propensity to engage in entrepreneurship.

# Neighbourhood level predictors and controls

This study makes a careful distinction between the individual and the environmental factors and defined the neighbourhood in a precise way, using the established UK methodology that identifies Lower Layer Super Output Areas (LSOA) as meaningful spatial units where individuals interact in a social and economic sense (Anderson, 2008). The study used the share of immigrants calculated as the proportion of internal immigrants and external immigrants as a source of creativity and entrepreneurial opportunities in the neighbourhood (LSOA). The study emphasises that diversity and openness to other cultures at the individual and neighbourhood level increases the neighbourhood’s capacity to accept and absorb new ideas or turning them into new entrepreneurial opportunities (Florida, 2004; Jacobs, 1961, 1969; Piergiovanni et al., 2012). In this sense, immigrants are not regarded as human capital but a proxy for unique opportunity related knowledge creation. In the analysis, two categories of the neighbourhood characteristics are used to test Hypotheses 2, 3 and 4 presented in the theoretical framework above. These include (I) share internal immigrants – denoting the average number of individuals who were born either in Wales, Scotland or Northern Ireland in the neighbourhood and (ii) share of external immigrants – refers to average number of individuals born outside the UK in the neighbourhood (Levie and Hart, 2013; Mickiewicz, et al., 2017).

 [Table 1 b]

In addition, three neighbourhood characteristics variables we included as control variables. These are the share of: (i) people who know other entrepreneurs, (ii) existing business owners in the neighbourhood, (iii) IMD as indicators of the neighbourhood context. Use of these variables is consistent with previous studies (e.g. Levie and Hart, 2013; Mickiewicz, et al., 2017; Stuetzer, et al., 2014). GEM data on share of respondents was utilised and calculated as a proportion of individuals in the neighbourhood who know other entrepreneurs and business owners to capture the context of East Midlands LSOAs. In a related study, Audretsch and Keilbach (2007a) used similar measures as indicators of a region’s endowment of entrepreneurship capital. Finally, in the specifications, fixed effects representing the higher territorial units, at a county level and a variable denoting urban versus rural areas were also included. Table 1b provide the description of the variables used in the analysis.

# Estimation strategy

This study employed the maximum likelihood logit estimator to predict the probability of an individual to engage in start-up activity. In order to get a more consistent estimator I included fixed effects relating to lower territorial units, at a LSOA level in the model. The model is constructed as follows (see, Greene and Hensher, 2010): $i $ denotes individual characteristics and $j$ denotes neighbourhood characteristics and employed the following model:

$y\_{ij}^{\*}=γx\_{ij}+ε\_{i}$,

$y\_{ij}=1 if y\_{ij}^{\*}>0, and 0 otherwise$.

In this case, *y* refers to observed entrepreneurial activity which is a dummy variable where 1 represents actual engagement in start-up activity. Then y*\** denotes unobserved utility of entrepreneurial activity with a mean at zero. The predictors and control variables are denoted by matrix ***x*** that comes with a vector of coefficients ***γ*** and I use all the variables listed in Table 1a and 1b above. In turn, $ε$relates to unobserved, individual specific heterogeneity (error term), which is assumed as unrelated to *x.* Finally, in the results section, I will present odds ratios instead of coefficients since they are easier to interpret.

Since the interest is on how the likelihood of individual start-up activity correlates with immigration, both at the individual and the neighbourhood level. I begin by estimating a model with the immigration variables at the individual level excluding the share of migrants and next the model is includes immigration variables both at the individual and neighbourhood level. Then in Table 4, the focus is on indirect effects of immigration on entrepreneurial activity. The analysis involves a stepwise inclusion of immigration variables and the first model includes regional migrant only, the second model includes immigrant only. In the third model, both the regional migrant and immigrant variables are included in the specification.

While most of the hypotheses relate to individual level variables, H2 concern the neighbourhood effect of immigrants. However, while calculating standard errors and the related significance levels, there was need to account for the fact that observations are interdependent within each local community (LSOA). Accordingly, the approach taken was to cluster the standard errors on the LSOA to make them robust. This enable to deal with the issue related to the possibility that individuals residing in the same LSOA are more likely to have similar characteristics, resources and capabilities that differentiate them from those residing in other LSOA. If such correlation is left unattended would result in the violation of one of the classical assumptions of the regression models. Finally, measures for diagnostics and explanatory power of the models were calculated and these are presented in Table 3 and 4 below. In addition, I examined the strength of relationship among the explanatory variables in order to detect the presents of multicollinearity. However, the results show that the minimum tolerance was 0.5937 and maximum VIF of 1.68 indicating a weak relationship among the variables. In addition, correlation coefficients of the variables used in this study are presented in Table 2 below.

 [Table 2]

# Estimation results

The estimation results are presented in Table 3, 4 and 5 below. This study reports odd ratios instead of logit coefficients in order to ease the interpretation. Therefore, it is important to remember that when interpreting the results, odds ratios higher than one denotes positive effects and odds ratios lower than one denotes negative effects.

[**Table 3**]

Regarding immigration, results for the individual and for the neighbourhood level variables are presented in Table 3. However, the odd ratios for these two variables cannot be directly compared although both represent an effect of a unit increase in a variable. For individual effects these are dummies and therefore the odds ratios directly measure a difference resulting from being an immigrant. Yet for neighbourhood effects the variables are continuous and defined as shares.

As shown in Table 3, Model 1and 2, an internal migrant is more likely to start a business than others. Yet being an external immigrant is negative and insignificant. Thus, external immigrants are less likely to start a new business than others. The result provides a partial support for Hypothesis 1.

In terms of neighbourhood characteristics, the share of internal immigrants and external immigrants in the neighbourhood are included in Model 2. The results show that a large share of the internal external immigrant population in the neighbourhood has a negative and insignificant effect on the probability of engaging in nascent entrepreneurial activity. Yet a large share of external immigrant population in the neighbourhood has a positive and significant effect on the likelihood of engaging in entrepreneurial activity. Thus, large share of the external immigrant population does not reduce the probability of starting a new firm and does not increase this probability either. this is inconsistent with results obtained by Audretsch, Dohse and Niebuhr (2010) and Mickiewicz, et al. (2017). Therefore, the results do not provide support for Hypothesis 2. Taken together, neighbourhood characteristics appear not to have a direct effect on an individual’s chances of starting a business.

[**Table 4**]

This section examines the indirect effects of immigration on entrepreneurship through an individual’s perception of entrepreneurial opportunity in their local community. The analysis focuses on the hypothesised link between immigration, as an indicator of the knowledge creation base, via the perceived entrepreneurial opportunities[[3]](#footnote-3) in the neighbourhood. The results are presented in Table 4.

In Model 1 with an internal migrant variable only, we see that having a high share of internal immigrants in the neighbourhood does not reduce or increase the likelihood of an individual to perceive new entrepreneurial opportunities than individuals who were not born in these countries. In contrast, in Model 2, the origin of an individual has an effect on the probability of perceiving new start-up opportunities. A high share of external immigrants in the neighbourhood increases the likelihood of an individual to perceive and identify new entrepreneurial opportunities. Including both the share internal immigrants and external immigrants in the Model 3 makes the effect of internal immigrants to remain positive and statistically insignificant. However, the effect of a high share of external immigrants remains positive and significant at the 5 percent level which provides a strong support to Hypothesis 3. This indicates that this group of immigrants have a higher cognitive dissonance which enables them to perceive more start-up opportunities in their local communities. This is consistent with the predictions of the creative class (Florida, 2004) and also in line with the economic geography literature concerning regional embeddness of knowledge creation processes (Jacobs, 1969; Obschonka et al., 2015; Stuetzer, et al., 2014). Taken together, the results provide a partial support for Hypothesis 3.

[**Table 5**]

The final stage of the analysis tests whether or not perceived start-up opportunities is associated with actual engagement in start-up activity (Hypothesis 4). To test this, the models employed in the first stage of the analysis were replicated but included perceived start-up opportunity as an individual level predictor. The results are presented in Table 5. As shown in Table 5, Model 2, perceived start-up opportunity is an important predictor of start-up, and has a positive and significant effect on an individual’s likelihood to engage in start-up activity. Taken together, this suggests that external immigrants have an indirect effect on individual entrepreneurship via perceived start-up opportunities.

# Discussion

The objective of this study has been to examine the direct and indirect effect immigrants on individual start-up. In doing so, it also investigated the differences between the origins of the immigrants. The emphasis was on the indirect effect of immigrants and developed theoretically informed hypothesis about how the origin of the immigrant may affect an individual perception of starting a new business in the neighbourhood and how this perceived opportunities may affect engagement in starting a new business.

At an individual level, the study finds that internal immigrants are more likely to start a business than others in East Midlands. This finding is consistent with studies that examined the determinants of entrepreneurship (Levie, 2007; Levie and Hart, 2013; Mickiewicz, et al., 2017). Contrary to expectations, the study finds that an external immigrant is less likely to start a business than others in the neighbourhood. Similarly, focusing on the share of internal immigrants and external immigrants in the neighbourhood, the study finds no empirical evidence for a direct effect of immigrants on the probability to start a business. This finding seem to be in contrast to studies that investigated the contribution of immigrants to entrepreneurship (Levie and Hart, 2013; Mickiewicz, et al., 2017; Rodríguez-Pose and Hardy, 2015). However, a deeper analysis revealed that these differences may be explained by a displacement effect resulting in an overrepresentation of immigrants or old age individuals in some LSOAs.

However, focusing on the share of immigrants in the neighbourhood, the absence of a direct effect does not mean that immigrants do not contribute to the start-up process in the East Midlands region. Instead, the finding point to the importance of their indirect effect on individual entrepreneurship. The findings suggest that internal migrants do not perceive more start-up opportunities than other individuals in their community. However, external immigrants perceive more opportunities to start a business than others and is consistent with previous work by Jacobs (1961, 1969), Bosma and Schutjens (2011) and Sternberg and Rocha (2007) who emphasised on the role of an individual’s perception of the environment as a key determinant of entrepreneurial behaviour.

From a theoretical perspective, two main arguments can be used to explain these differences. On the one hand, immigrants’ involvement in dual cultures and perceived potential ethnic market enlarges their search space and can increase their perception of start-up opportunities (Basu, 2006; Bolívar-Cruz, et al., 2014). On the other hand, the theory of cognitive dissonance (Festinger, 1957) can help us to understand principle of immigrant’s desire for success which is consistent with attitudes and behaviours (Jacobs, 1961, 1969). When immigrants decide to leave their home country, their decision is based on expected economic rewards gained from moving to other countries and this optimism of finding better opportunities can help them to perceive more start-up opportunities than natives.

Another interesting finding is that, although external immigrants perceive more opportunities to start a business in East Midlands region than others, they do not commercially exploit them. Although autonomous decision making, risk taking, experimentation and confronting failure are characteristics of an immigrant’s entrepreneurial behaviour (Neville, et al., 2014; Parker, 2009), the effect of these factors may be attenuated if the existing social, economic and legal relationships are characterised by a higher degree of security, tradition and conformity. Under such conditions, immigrants anticipating to start a new business may not receive social support and co-operation which may prevent them from engaging in the start-up process and eventually creating a new business. It is at this stage where diversity plays a crucial role in shaping common values and attitude. It may transform the neighbourhood into one that becomes more inclusive and tolerant allowing it create a conducive environment where non-standard behaviour, experimentation, new ideas are accepted and supported which may lead to the creation of new businesses.

Moreover, neighbourhood characteristics which are objective measures seem to operate as distal factors, therefore, may not have a direct effect on entrepreneurial behaviour unless they are perceived and valued by an individual as suggested by the findings of this study. At the same time people in same community may differ in their perception of the local environment. This could be due to differences among people in evaluating new ideas resulting in divergences in evaluations and value of new ideas towards those that support entrepreneurship through acceptance of non-standard behaviour within the neighbourhood. Thus, the perception of start-up opportunities in the neighbourhood should not lead to starting a business all the time. As discussed by Jacobs (1961, 1969) and Fishbein and Ajzen (2011), culture and values may also play an important role in addition to distal motivation factors that directly underpins behaviour.

# Conclusion

In this article, it is acknowledged that the study has some important limitations. First, due to the cross sectional nature made it impossible to model the longitudinal nature of the start-up process, therefore, the results should be interpreted as correlative rather than causal. This also prevented conducting mediation test of the hypotheses. Second, the study might have suffered from endogeneity issues. Use of other indicators of culture and values might have partly might have reduced endogeneity problems but they were not available in the GEM databases.

 Based on the results, the study concludes that both attracting a constant in-flow of immigrants and retaining them is good for entrepreneurship. In terms of immigration, the results provide compelling evidence that, in fact, starting a new business is more likely for external immigrants than others and their presence in the neighbourhood also increases the likelihood of others in neighbourhood to engage in entrepreneurial activity. Arguably, the latter is more complex and understanding of it helps to address the ambiguity found in earlier literature. It suggests that having a large share of people with diverse origins with different background is more conducive to entrepreneurship and a higher degree of diversity forms an ideal breeding ground for start-ups which makes external immigrants a “precious economic asset” for the regions’ socio-economic development (Jacobs, 1961, p. 219). The study emphasises on the need to review the way we think about immigrants and entrepreneurship. Specifically, what is often attributed to ‘self-selection’ and to the dynamism of individual migrants, characterised by entrepreneurial skills, may be confounded with positive local externalities they produce for the local community. Areas that absorb large in-flows of immigrants, also gain in diversity, which is an important factor in enhancing local entrepreneurship. Therefore, the argument here, is that the critical factor for local entrepreneurship is not just that external immigrants come with unique knowledge and skills that they utilise in the creation of their own businesses, but rather that they produce positive local spill-over effects (positive local externalities). This is a conclusion that has clear implications both for policies and for the way we think about people moving across borders.

With respect to retaining immigrants, it appears that retaining a large share of individuals in the neighbourhoods characterised by diverse birthplace can be the primary driver of entrepreneurship. In addition, continuous attraction of a large in-flow of immigrants from different cultural background creates conditions for a dynamic entrepreneurial local environment. The study argues that it is a high immigrant population retained in the neighbourhood characterised by multiple residence categories that is most conducive for start-ups. Therefore, any attempt by policy makers to restrict the in-flow of immigrants is more likely to create a large dent on entrepreneurship which may affect the potential for generating employment and economic growth. If East Midlands want to enhance its status as a region remaining open for business, attracting a constant in-flow of immigrants from around the globe and retaining them makes the regional economy entrepreneurial. This conclusion has clear policy lessons for East Midlands and beyond that is, remaining open to immigrants makes the local and regional economy more entrepreneurial.

**Tables**

**Table1a: Variable description**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Description** | **Percentage** |
| ***Dependent variables***  |
| Start-up | 1= if respondent is actively engaged in the start-up process  | 5.06 |
|  | 0 = otherwise  | 94.94 |
| Perceived start-up opportunities | 1= if respondents saw good start-up opportunities in their local community in the following sixth months  | 15.90 |
|  | 0 = otherwise | 84.10 |
| ***Individual level predictors*** |
| External immigrant | 1= if respondent was born in others countries outside the UK | 6.62 |
|  | 0 = otherwise  | 93.38 |
| Internal immigrant  | 1 = if born in Wales, Scotland or Northern Island | 3.53 |
|  | 0 = otherwise | 96.47 |
| ***Individual level controls*** |
| Age | 1= if respondent is under 46 years  | 50.03 |
|  | 0= otherwise  | 49.97 |
| Gender: Female | 1 = if female | 59.35 |
|  | 0 = if not | 40.65 |
| Household income | 1 = if household income was £50,000 or more.0 = otherwise | 83.8916.11 |
| Higher education | 1 = if graduate or postgraduate educational attainment0 = if not | 26.5673.44 |
| Knowledge and skills  | 1 = if respondent believed to have the knowledge, skills andexperience required to start a new business0 = otherwise | 68.1731.83 |
| In Employment | 1 = dummy if respondent was employed 0 = if not  | 74.0725.93 |
| Urban areas | 1 = if Lower Super OutPut Areas (LSOA)is in an urban area0 = if Lower LSOA is in rural area | 67.2232.78 |
| Knowing entrepreneurs | 1 = if respondent knew someone who started a business during the previous 2 years 0 = otherwise  | 14.7285.28 |
| Business owners  | 1 = if respondent is an owner/manager of an established business0 = if not | 8.6591.35 |
| Former business owner | 1 = if respondent has shut down a business in past 12 months0 = if not | 97.932.07 |
| Years living in region | Categorical variable - number of years the respondent has been living in the region;1 = 0 to 5 years2 = 6 to 15 years3 = 16 to 25 years4 = 26 to 35 years5 = Over 35 years (Benchmark-omitted category) | 10.2712.8916.0717.5843.20 |
| East Midlands Counties  | Categorical variable:1 = Derbyshire (Benchmark category)  | 23.42 |
|  | 2 = Leicestershire | 21.98 |
|  | 3 = Lincolnshire | 17.28 |
|  | 4 = Northamptonshire | 14.63 |
|  | 5 = Nottinghamshire | 22.69 |
| IMD | Categorical variable:IMD Quintile 1 - for the most deprived LSOA (Benchmark category) | 25.64 |
|  | IMD Quintile 2 | 23.67 |
|  | IMD Quintile 3 | 19.37 |
|  | IMD Quintile 4 | 18.38 |
|  | IMD Quintile 5 - for the least deprived LSOA | 12.94 |

**Table1b: Description of continuous variables**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Description** | **Mean** | **St.dev.** | **Range** |
| ***Neighbourhood level predictors***  |
| Internal immigrants: LSOA mean | Share of respondents in the neighbourhood who were born in Wales, Scotland or Northern Ireland | 0.0354 | 0.104 | 0 - 1 |
| External immigrants: LSOA mean  | Share of respondents in the neighbourhood who were born in other countries outside theUK | 0.066 | 0.154 | 0 - 1 |
| ***Neighbourhood level controls*** |
| Knowing entrepreneurs: LSOA mean | Share of respondent in the neighbourhood who know others who started businesses in the previous 2 years  | 0.147 | 0.194 | 0 - 1 |
| Business owners: LSOA mean | Share of owners/managers of businesses in the neighbourhood | 0.0865 | 0.155 | 0 - 1 |

**Table 2: Correlations coefficients for the variables used in this study**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 1 Start-up activity  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 Perceived start-up opportunities | 0.21 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 Internal immigrant | 0.02 | -0.00 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 External immigrant | -0.01 | 0.01 | -0.05 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 Internal immigrant: lsoa mean | 0.01 | 0.01 | 0.56 | -0.04 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 External immigrant: lsoa mean | -0.00 | 0.02 | -0.03 | 0.62 | -0.06 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 Age | -0.06 | -0.09 | 0.07 | -0.08 | 0.04 | -0.08 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 Female | -0.09 | -0.10 | -0.02 | 0.01 | -0.02 | -0.00 | -0.02 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 Household income  | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | -0.00 | -0.03 | -0.00 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 Higher education | 0.05 | 0.07 | 0.05 | 0.10 | 0.04 | 0.06 | -0.08 | -0.03 | 0.17 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| 11 Knowledge and skills  | 0.16 | 0.18 | 0.01 | 0.02 | 0.02 | 0.03 | 0.01 | -0.09 | 0.08 | 0.06 | 1 |  |  |  |  |  |  |  |  |  |  |
| 12 In employment | 0.08 | 0.07 | 0.00 | -0.00 | 0.01 | -0.01 | -0.15 | -0.11 | 0.11 | 0.13 | 0.08 | 1 |  |  |  |  |  |  |  |  |  |
| 13 Knowing entrepreneurs | 0.22 | 0.30 | 0.01 | 0.04 | 0.01 | 0.03 | -0.11 | -0.11 | 0.05 | 0.11 | 0.18 | 0.09 | 1 |  |  |  |  |  |  |  |  |
| 14 Business owners  | 0.38 | 0.18 | -0.00 | -0.02 | 0.00 | -0.03 | 0.06 | -0.15 | 0.09 | 0.03 | 0.22 | 0.16 | 0.19 | 1 |  |  |  |  |  |  |  |
| 15 Former business owner | 0.09 | 0.08 | 0.03 | 0.03 | 0.03 | 0.02 | -0.00 | -0.06 | 0.01 | 0.02 | 0.10 | -0.01 | 0.14 | 0.06 | 1 |  |  |  |  |  |  |
| 16 Years living in region | -0.05 | -0.09 | -0.09 | -0.21 | -0.06 | -0.14 | 0.48 | -0.04 | -0.08 | -0.26 | -0.04 | -0.06 | -0.11 | 0.03 | -0.03 | 1 |  |  |  |  |  |
| 17 Urban areas | -0.03 | -0.02 | -0.01 | 0.09 | -0.02 | 0.14 | -0.07 | -0.02 | -0.08 | -0.03 | -0.10 | -0.01 | -0.02 | -0.07 | -0.04 | 0.05 | 1 |  |  |  |  |
| 18 Knowing entrepreneurs: lsoa mean  | 0.11 | 0.16 | 0.01 | 0.04 | 0.02 | 0.06 | -0.07 | -0.05 | 0.05 | 0.08 | 0.33 | 0.06 | 0.55 | 0.10 | 0.08 | -0.07 | -0.02 | 1 |  |  |  |
| 19 Business owners: lsoa mean  | 0.22 | 0.11 | 0.00 | -0.04 | 0.00 | -0.06 | 0.04 | -0.06 | 0.07 | 0.02 | 0.40 | 0.08 | 0.10 | 0.55 | 0.04 | 0.01 | -0.13 | 0.19 | 1 |  |  |
| 20 East Midlands counties | -0.02 | 0.01 | 0.02 | -0.01 | 0.03 | -0.02 | 0.00 | 0.03 | -0.01 | -0.02 | 0.00 | -0.00 | -0.01 | 0.00 | -0.01 | -0.03 | -0.04 | -0.01 | 0.01 | 1 |  |
| 21 IMD | -0.02 | -0.05 | -0.02 | 0.07 | -0.03 | 0.11 | -0.09 | 0.00 | -0.18 | -0.15 | -0.16 | -0.10 | -0.04 | -0.07 | -0.03 | 0.02 | 0.28 | -0.07 | -0.13 | -0.01 | 1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table3: The effect of immigration on likelihood of engaging in entrepreneurial activity**

|  |  |
| --- | --- |
|  | **Dependent variable: actual engagement in start-up activity**  |
|  |  |
|  | **(Model 1)** | **(Model 2)** |
| ***Individual level explanatory variables*** |  |  |
| Internal immigrant | 1.102\*\* | 1.129\* |
|  | (0.041) | (0.061) |
| External immigrant | 0.881+ | 0.832\* |
|  | (0.065) | (0.060) |
| ***Neighbourhood level explanatory variables*** |  |  |
| Internal immigrant: LSOA mean |  | 0.954 |
|  |  | (0.077) |
| External immigrant: LSOA mean |  | 1.096 |
|  |  | (0.062) |
| ***Individual level controls*** |  |  |
| Age | 0.970\*\*\* | 0.970\*\*\* |
|  | (0.0045) | (0.0044) |
| Female | 0.818 | 0.818 |
|  | (0.10) | (0.10) |
| Household income  | 0.891+ | 0.890+ |
|  | (0.055) | (0.054) |
| Higher education | 1.119+ | 1.118+ |
|  | (0.075) | (0.075) |
| Knowledge and skills  | 1.511\*\*\* | 1.506\*\*\* |
|  | (0.089) | (0.088) |
| In employment | 1.110 | 1.115 |
|  | (0.074) | (0.075) |
| Knowing entrepreneurs | 1.644\*\*\* | 1.651\*\*\* |
|  | (0.075) | (0.075) |
| Business owners  | 2.131\*\*\* | 2.133\*\*\* |
|  | (0.10) | (0.10) |
| Former business owner | 1.940+ | 1.943+ |
|  | (0.68) | (0.69) |
| 0 to 5 years | 1.421 | 1.427 |
|  | (0.32) | (0.32) |
| 6 to 15 years | 1.527\* | 1.546\* |
|  | (0.27) | (0.28) |
| 16 to 25 years | 1.458+ | 1.462+ |
|  | (0.29) | (0.29) |
| 26 to 35 years | 1.380\* | 1.387\* |
|  | (0.21) | (0.21) |
| ***Neighbourhood level controls*** |  |  |
| Urban areas | 0.948 | 0.944 |
|  | (0.068) | (0.068) |
| Knowing entrepreneurs: LSOA mean  | 0.410\*\* | 0.394\*\* |
|  | (0.14) | (0.14) |
| Business owners: LSOA mean  | 0.965 | 0.967 |
|  | (0.055) | (0.055) |
| Leicestershire | 0.943 | 0.932 |
|  | (0.055) | (0.053) |
| Lincolnshire | 0.930 | 0.927 |
|  | (0.053) | (0.054) |
| Northamptonshire | 0.890\*\* | 0.887\*\* |
|  | (0.037) | (0.038) |
| Nottinghamshire | 0.888\* | 0.887\* |
|  | (0.051) | (0.051) |
| IMD: Quintile 2 | 1.339 | 1.334 |
|  | (0.25) | (0.24) |
| IMD: Quintile 3 | 1.135 | 1.124 |
|  | (0.22) | (0.22) |
| IMD: Quintile 4 | 0.971 | 0.954 |
|  | (0.18) | (0.18) |
| IMD: Quintile 5 | 1.742\* | 1.718\* |
|  | (0.39) | (0.39) |
| Constant | 0.0544\*\*\* | 0.0540\*\*\* |
|  | (0.026) | (0.026) |
| *Observations* | 8302 | 8302 |
| *Log-likelihood* | -1189.2 | -1188.1 |
| *Wald’s Chi-square* | 1928.1 | 2505.9 |
| *DF* | 26 | 28 |
| *Pseudo R-squared* | 0.283 | 0.284 |

Notes: Exponentiated coefficients.

 Clustered standard errors presented in parentheses.

 Asterisks denotes significant levels where + p<0.1; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

**Table 4: Indirect effect of immigration on an individual opportunity perception**

|  |  |
| --- | --- |
|  | **Dependent variable: Perceived start-up opportunities** |
|  |  |  |  |
|  | **(Model 1)** | **(Model 2)** | **(Model 3)** |
| ***Neighbourhood level explanatory variables*** |  |  |  |
| Internal immigrant: LSOA mean | 1.017 |  | 1.022 |
|  | (0.036) |  | (0.037) |
| External immigrant: LSOA mean |  | 1.103\*\* | 1.105\*\* |
|  |  | (0.041) | (0.041) |
| ***Individual level controls*** |  |  |  |
| Internal immigrant | 0.961 |  | 0.957 |
|  | (0.039) |  | (0.038) |
| External immigrant |  | 0.928\* | 0.925\* |
|  |  | (0.034) | (0.033) |
| Age | 1.297\*\*\* | 1.304\*\*\* | 1.296\*\*\* |
|  | (0.083) | (0.084) | (0.083) |
| Female | 0.706\*\*\* | 0.708\*\*\* | 0.708\*\*\* |
|  | (0.043) | (0.043) | (0.043) |
| Household income  | 0.951\* | 0.951\* | 0.951\* |
|  | (0.022) | (0.022) | (0.022) |
| Higher education | 1.207\* | 1.203\* | 1.206\* |
|  | (0.097) | (0.096) | (0.097) |
| In employment | 1.044 | 1.045 | 1.045 |
|  | (0.037) | (0.038) | (0.038) |
| Knowing entrepreneurs | 1.718\*\*\* | 1.725\*\*\* | 1.725\*\*\* |
|  | (0.062) | (0.064) | (0.064) |
| Business owners  | 1.271\*\*\* | 1.272\*\*\* | 1.271\*\*\* |
|  | (0.047) | (0.047) | (0.047) |
| Former business owner | 1.535+ | 1.530+ | 1.534+ |
|  | (0.34) | (0.35) | (0.35) |
| 0 to 5 years | 1.267+ | 1.272+ | 1.284+ |
|  | (0.16) | (0.17) | (0.17) |
| 6 to 15 years | 1.449\*\* | 1.449\*\* | 1.460\*\* |
|  | (0.16) | (0.17) | (0.17) |
| 16 to 25 years | 1.507\*\*\* | 1.498\*\*\* | 1.505\*\*\* |
|  | (0.12) | (0.12) | (0.12) |
| 26 to 35 years | 1.291\*\* | 1.284\*\* | 1.290\*\* |
|  | (0.10) | (0.10) | (0.10) |
| ***Neighbourhood level controls*** |  |  |  |
| Urban areas | 1.003 | 0.997 | 0.998 |
|  | (0.032) | (0.032) | (0.032) |
| Knowing entrepreneurs: LSOA mean  | 0.789 | 0.761 | 0.761 |
|  | (0.16) | (0.16) | (0.16) |
| Business owners: LSOA mean  | 1.050 | 1.051 | 1.052 |
|  | (0.038) | (0.038) | (0.038) |
| Leicestershire | 0.858\* | 0.836\* | 0.837\* |
|  | (0.063) | (0.064) | (0.064) |
| Lincolnshire | 1.026 | 1.018 | 1.017 |
|  | (0.12) | (0.12) | (0.12) |
| Northamptonshire | 1.129 | 1.111 | 1.110 |
|  | (0.13) | (0.13) | (0.13) |
| Nottinghamshire | 1.031 | 1.030 | 1.031 |
|  | (0.080) | (0.080) | (0.080) |
| IMD: Quintile 2 | 0.931 | 0.927 | 0.928 |
|  | (0.086) | (0.086) | (0.086) |
| IMD: Quintile 3 | 0.923 | 0.917 | 0.918 |
|  | (0.098) | (0.098) | (0.097) |
| IMD: Quintile 4 | 0.826 | 0.814 | 0.814 |
|  | (0.10) | (0.10) | (0.10) |
| IMD: Quintile 5 | 0.787+ | 0.771+ | 0.772+ |
|  | (0.10) | (0.10) | (0.10) |
| Constant | 0.113\*\*\* | 0.116\*\*\* | 0.115\*\*\* |
|  | (0.030) | (0.032) | (0.032) |
| *Observations* | 8346 | 8346 | 8346 |
| *Log-likelihood* | -3241.7 | -3239.1 | -3238.5 |
| *Wald’s Chi-square* | 1099.8 | 1380.3 | 1438.2 |
| *DF* | 25 | 25 | 27 |
| *Pseudo R-squared* | 0.113 | 0.114 | 0.114 |

Notes: Exponentiated coefficients.

 Clustered standard errors presented in parentheses.

 Asterisks denotes significant level where + p<0.1; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001.

**Table 5: Effect of perceived start-up opportunities on individual start-up activity**

|  |  |
| --- | --- |
|  | Dependent variable: Engagement in start-up activity |
|  |  |  |
|  | **(Model 1)** | **(Model 2)** |
| ***Individual level explanatory variable*** |  |  |
| Perceived start-up opportunities |  | 2.095\*\*\* |
|  |  | (0.21) |
| ***Individual level controls*** |  |  |
| Internal immigrant | 1.103+ | 1.106+ |
|  | (0.060) | (0.060) |
| External immigrant | 0.832\*\* | 0.827\*\* |
|  | (0.058) | (0.058) |
| Age | 1.949\*\*\* | 1.881\*\*\* |
|  | (0.21) | (0.21) |
| Female | 0.913 | 0.956 |
|  | (0.12) | (0.13) |
| Household income  | 0.890\* | 0.889\* |
|  | (0.050) | (0.050) |
| Higher education | 1.117+ | 1.112 |
|  | (0.074) | (0.075) |
| Knowledge and skills | 2.584\*\*\* | 2.441\*\*\* |
|  | (0.25) | (0.24) |
| In employment | 1.061 | 1.064 |
|  | (0.081) | (0.079) |
| Knowing entrepreneurs | 1.379\*\*\* | 1.309\*\*\* |
|  | (0.062) | (0.058) |
| Business owners  | 1.709\*\*\* | 1.706\*\*\* |
|  | (0.078) | (0.077) |
| Former business owner | 1.707+ | 1.714+ |
|  | (0.52) | (0.53) |
| 0 to 5 years | 1.495+ | 1.420 |
|  | (0.34) | (0.33) |
| 6 to 15 years | 1.604\*\* | 1.521\* |
|  | (0.28) | (0.26) |
| 16 to 25 years | 1.778\*\* | 1.693\*\* |
|  | (0.33) | (0.31) |
| 26 to 35 years | 1.458\* | 1.409\* |
|  | (0.22) | (0.20) |
| ***Neighbourhood level controls*** |  |  |
| Urban areas | 0.952 | 0.946 |
|  | (0.072) | (0.073) |
| Internal immigrant: LSOA mean | 0.974 | 0.979 |
|  | (0.080) | (0.081) |
| External immigrant: LSOA mean | 1.118+ | 1.120+ |
|  | (0.065) | (0.066) |
| Knowing entrepreneurs: LSOA mean  | 0.705 | 0.723 |
|  | (0.25) | (0.26) |
| Business owners: LSOA mean  | 1.106+ | 1.101+ |
|  | (0.059) | (0.060) |
| Leicestershire | 0.956 | 0.954 |
|  | (0.060) | (0.062) |
| Lincolnshire | 0.935 | 0.934 |
|  | (0.054) | (0.056) |
| Northamptonshire | 0.887\*\* | 0.880\*\* |
|  | (0.041) | (0.041) |
| Nottinghamshire | 0.906 | 0.902+ |
|  | (0.055) | (0.055) |
| IMD: Quintile 2 | 1.319 | 1.325 |
|  | (0.25) | (0.24) |
| IMD: Quintile 3 | 1.075 | 1.089 |
|  | (0.22) | (0.22) |
| IMD: Quintile 4 | 0.937 | 0.990 |
|  | (0.18) | (0.18) |
| IMD: Quintile 5 | 1.851\*\* | 1.931\*\* |
|  | (0.42) | (0.42) |
| Constant | 0.00656\*\*\* | 0.00555\*\*\* |
|  | (0.0029) | (0.0024) |
| *Observations* | 8346 | 8346 |
| *Log-likelihood* | -1134.1 | -1115.7 |
| *Wald’s Chi-square* | 3233.9 | 4383.2 |
| *DF* | 28 | 29 |
| *Pseudo R-squared* | 0.321 | 0.332 |

Notes: Exponentiated coefficients.

 Clustered standard errors presented in parentheses.

 Asterisks denotes significant level where + p<0.1; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001.

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2. Mobility of people within country resulting in start-ups is an important research direction (Andreson and Klepper 2013). However, a limitation of the available GEM data is that we cannot identify returning migrants (see Bosma, et al., 2012; Li et al., 2012; Wahba and Zenou, 2012). [↑](#footnote-ref-2)
3. It is important to note that this variable is now a dependent variable in all the models presented in Table 4. [↑](#footnote-ref-3)