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Abstract

A growing empirical literature has established a positive relationship between cultural diversity and entrepreneurship rates, often attributing this effect to innovative benefits of diversity. However, not all entrepreneurship is inherently innovative, raising the question of whether cultural diversity may increase the relative prevalence of entrepreneurs pursuing innovative instead of more replicative strategies. This study investigates the relationship between regional cultural diversity and the innovation-orientation of early-stage entrepreneurs and considers moderating factors by decomposing shares of foreign-born population by origin within and outside of the EU and by education level. Combining survey data from the Global Entrepreneurship Monitor with various measures of cultural diversity, we carry out a multilevel analysis for 166 European regions. The results suggest that entrepreneurs in more culturally diverse regions are significantly more likely to exhibit innovation-orientation. We find some evidence that this effect is supported by cognitive proximity as the share of EU-born foreign population is driving this result. Moreover, our analysis suggests that the effect of cultural diversity on innovative entrepreneurship is not due to human capital availability or moderated by entrepreneurs' absorptive capacity but rather stems from the diversity in cultural background itself.

Plain English Summary

In regions with a culturally diverse population, entrepreneurs are more likely to pursue innovative rather than replicative business models. According to theory, cultural diversity offers new knowledge, ideas and approaches, which can foster innovation and entrepreneurship. In this study we investigate the role of cultural diversity in explaining regional-level differences in the prevalence of innovation-oriented entrepreneurs in Europe. Using different measures of cultural diversity, we find that more diversity indeed seems to stimulate innovative entrepreneurship, especially for foreign-born population from other EU countries. The results present a strong argument for policy makers to embrace immigration and to benefit from the innovation potential of culturally diverse populations.

Keywords: cultural diversity, entrepreneurship, innovation, European regions, multilevel analysis

JEL: F22, L26, O30, R1

1 INTRODUCTION

A recent and growing empirical literature recognises cultural diversity of the local population not simply in contexts of inclusive societies and workplaces but as a factor influencing economic performance. Positive linkages have been documented between cultural diversity in terms of ethnic background or country of birth with, for instance, productivity (e.g. Kemeny & Cooke, 2018; Ottaviano & Peri, 2005, 2006; Trax et al., 2015) and economic growth (e.g. Bove & Elia, 2017; Docquier et al., 2020; Rodríguez-Pose & von Berlepsch, 2019). These findings are often interpreted as diversity fuelling innovation. More specifically, cultural diversity provides varied experiences, behaviours, markets, knowledge and skills, which can lead to the emergence of new ideas. Empirical evidence of the potential of cultural diversity thus considers effects on innovative output measures such as patents (Nathan, 2015; Niebuhr, 2010; Ozgen et al., 2011), introduction of innovations within firms (Brixy et al., 2020; Nathan & Lee, 2013) but also on entrepreneurship (e.g. Audretsch et al., 2010, 2021; Rodríguez-Pose & Hardy, 2015).

However, not all entrepreneurship is inherently innovative. In fact, entrepreneurship has been described as having two distinct faces representing two types of entrepreneurial behaviour: *replicative* versus *innovative* business orientation (Baumol, 2010). Innovation-oriented entrepreneurship is grounded in the Schumpeterian perspective on entrepreneurs as innovators, commercializing new combinations of (existing) production factors (Schumpeter, 1942; Sledzik, 2013). Replication-orientation is instead characterised by adopting existing business ideas, thus serving to establish and diffuse them. Making distinctions between innovative and replicative entrepreneurship is particularly relevant in early business stages where firms face challenges of matching products and markets, as well as liabilities of newness, smallness and opportunity costs.

The pronounced (and persistent) uneven spatial distribution of entrepreneurship is well-documented (e.g. Liñán & Fernandez-Serrano, 2014; Fornahl, 2007; Beugelsdijk, 2007; Fritsch & Wyrwich, 2014) and illustrates the relevance of regional characteristics in enabling or hindering entrepreneurship. In this sense, the two different types of entrepreneurship may not only have different roles in the process of economic development – creating business ideas and diffusing these ideas respectively – they are also likely to be influenced by different types of regional conditions. For instance, regional 'entrepreneurial culture' (as emphasised amongst others by Feldman (2014) and Fritsch & Wyrwich (2014)), capturing a tolerance for risk and failure, role model presence and appraisal for innovation, may be instrumental in supporting nascent or new entrepreneurs in their decision to develop novel products and services rather than engaging in replicative entrepreneurship.

Theoretically, the premise for cultural diversity as a conduit for innovation can be traced back to the seminal work by Schumpeter (1947) who argued that innovation relies on the recombination of factors but also to Jane Jacobs' ideas on innovation as the combination of different perspectives (1969). Contexts with a large heterogeneity, e.g. in production factors, markets or economic agents, offer more opportunities to recombine types of knowledge, capital and labour thus stimulating innovative entrepreneurship. The resource-based view and especially the individual-opportunity nexus literature, emphasize the way in which individual actors discover and pursue (external) opportunities presenting themselves (Shane 2003; Kirzner 2003). Similarly, the knowledge spillover theory of entrepreneurship (Acs et al., 2013) suggests that the availability of new knowledge in the region influences the type of entrepreneurship and would especially benefit prospective entrepreneurs taking up innovative and technological business ideas.

Applying these arguments to the composition of regional populations would suggest that regions with a more diverse population in terms of cultural backgrounds, would offer a broader variety of knowledge, habits and routines for potential entrepreneurs to use in creating and building their business. This variety could trigger an environment in which entrepreneurs see more opportunities to recombine knowledge

and discover or create market niches, apply old business concepts to new markets, or develop novel applications, thus expressing innovation-orientation in entrepreneurship. Therefore, the main objective of this paper is to investigate the relationship between cultural diversity and innovation-oriented entrepreneurship across European regions.

The paper's first contribution is differentiating between innovative and replicative entrepreneurship. The existing empirical literature largely considers the effect of diversity on generic entrepreneurship rates, i.e. without acknowledging that entrepreneurial ventures may differ in their innovative aspirations. While both types of entrepreneurship are relevant for economic development, the theoretical mechanism of diversity spurring knowledge recombination and innovation, implies that diverse regions may offer advantageous conditions specifically for innovation-oriented entrepreneurship. Examining the distinctive nature of different types of entrepreneurship thus allows further insight into the relationship between diversity and innovation as well as the role of regional characteristics in fuelling local entrepreneurial activity.

Second, this study aims to further disentangle the effect of diversity by considering the role of the regional population composition (in terms of foreign EU and non-EU population, combined with education level) as well as exploring and comparing different measures of cultural diversity. We contribute to the existing empirical literature by investigating diversity and entrepreneurship across regions in 25 European countries but considering individual-level information on early-stage entrepreneurs and their (self-reported) innovation-orientation. Whereas the majority of previous literature focuses on specific national contexts (e.g. Audretsch et al., 2010; Mickiewicz et al., 2019; Rodríguez-Pose & Hardy, 2015; Sobel et al., 2010; Sun et al., 2019) or considers firm formation aggregated at a national or regional scale (Audretsch et al., 2021; Awaworyi Churchill, 2017), this study implements a multilevel analysis that simultaneously considers individual, regional and national characteristics while also exploiting the large degree of spatial variation in entrepreneurship and diversity across the European Union.

This paper proceeds as follows. Section 2 describes the theoretical background on the relationship between diversity and entrepreneurship with particular concern for the role of innovation. Section 3 discusses the data and methodological approach. Section 4 presents the results before offering discussion and concluding remarks in section 5.

2 THEORETICAL BACKGROUND

Entrepreneurship at the interplay of individual and context factors

Studies adopting e.g. a resource-based view and entrepreneurial ecosystems perspectives have convincingly demonstrated that both individual and context factors matter to entrepreneurship in general and entrepreneurial innovativeness in particular (Koellinger, 2008; Stam, 2015). It is at the intersection of the (regional) environment and individual actors where the process of entrepreneurship, and especially innovative entrepreneurship, begins. Below, we first highlight key perspectives from economic geography and entrepreneurship literatures, before connecting regional cultural diversity with innovative entrepreneurship and developing hypotheses accordingly. It should be noted that the concepts of regional diversity and innovation feature in a large variety of literatures and as such, diversity can refer to many different concepts including e.g. regional industrial diversification, urban diversity or embeddedness in diverse (international) networks (Karlsson et al., 2021). In this paper we focus on

cultural diversity, i.e. diversity in terms of the composition of regional population by country of birth, and specifically on the potential of cultural diversity to stimulate innovative entrepreneurship.

Contributions from the economic geography literature have emphasized the importance of contextual factors characterizing the local entrepreneurial ecosystem. These include for example the social environment of the potential entrepreneur, a supportive regional business climate and entrepreneurial attitudes that may encourage new entrepreneurial initiatives (Stam & Spigel, 2018). Regional economic circumstances (in terms of market demand) and the demographic composition (in terms of supply of potential entrepreneurs) influence regional entrepreneurship rates (Bosma and Schutjens, 2009a). Specific 'opportunity related' economic circumstances may evoke or limit entrepreneurial activity: such as market concentration, entry- and exit barriers, unemployment level, and urbanization or localization effects (Wasdani & Mathew, 2014; Stam, 2015; Sternberg, 2009).

From the individual perspective and in the Kirznerian tradition, the individual-opportunity nexus literature emphasizes the identification, evaluation and exploitation of opportunities as stages of the entrepreneurial process (Shane and Venkataraman 2000; Shane 2003). This literature rejects the idea that entrepreneurship is an individual act only, but also the proposition that merely external factors are driving entrepreneurship. Based on the dispersion of knowledge over time (Knight, 1921; Arrow, 1974), place and people (cf. Akerlof, 1970), heterogenous expectations are formed on identified entrepreneurial opportunities with the result that these may lead to distinct entrepreneurial exploitation (Dew et al. 2004). Thus, it is at the intersection of individual activity and the existing (variety in) resources in the environment, that entrepreneurship is born. Put differently, it requires actors who are able to discover and identify, or even create opportunities (Alvarez & Barney 2007) and an enabling environment (Davidsson, Recker & Von Briel 2020) that offers such actors a relevant and promising mix of resources.

Three mechanisms by which cultural diversity drives innovative entrepreneurship

Regional cultural diversity can be linked to entrepreneurship and innovation in three different but interrelated ways, according to both the resource-based view and knowledge spillover theory, and the literature on entrepreneurship at the individual-opportunity nexus. The first two linkages stem from the promise of cultural diversity for identifying new business opportunities, whereas the third linkage addresses the attractiveness of culturally diverse regions for innovative entrepreneurs to move into the region. We discuss these three types of linkages below.

First, *diversity of agents* implies that existing opportunities may be evaluated differently. In the Kirznerian view, 'alertness' is key in the first phases of entrepreneurial activity. Alertness is defined by the identification of opportunities at low (search) costs ("*the ability to notice without search opportunities that have been hitherto overlooked*" Kirzner 1979 p. 148).

The second mechanism concerns *diversity in regional business opportunities*. Central in Kirzner's view is the existence of 'objective' opportunities, waiting for individuals to identify and pursue them, as opposed to a more creationist view of people creating opportunities themselves (McMullen & Shepherd 2006; Alvarez & Barney 2007; Tang et al. 2012). The phrase '*without search*' in Kirzner's definition above implies that business ideas may arise in regions offering many unidentified opportunities. In this line of thought, in culturally diverse regions, it is relatively easy to discover opportunities for using or recombining resources, serving varied groups of customers, and inventing and producing products. Similarly, the knowledge spillover theory of entrepreneurship (Acs et al., 2009, 2013) proposes that entrepreneurial opportunities emerge from local availability of knowledge, i.e. that individuals can tap into flows of information, knowledge and skills from other actors and incumbent firms, which may fuel new entrepreneurial ideas. It thus emphasises investment in research and education as a pathway to increase business opportunities, entrepreneurship and, ultimately, economic growth through the mechanism of creating and disseminating new knowledge.

From the perspective of the knowledge spillover theory, regional cultural diversity not only signals the presence of varied knowledge and ideas but also relates to the value of human capital. More specifically, cultural diversity is often a consequence of immigration, which implies a transfer of knowledge and human capital and can be seen as a contributing factor to innovation itself (for a survey of the literature on migration and innovation see Breschi et al., 2016). Depending on the skill-level of migrants, regional diversity may thus imply access to specific skills and knowledge, illustrating that studies on the relationship between diversity and entrepreneurship may also need to take into account educational factors. Rodríguez-Pose and Hardy (2015) consider the interrelation between diversity and human capital by considering diversity in different skill groups finding that diversity among the highly-skilled is especially beneficial for regional start-ups. Similarly, Marino et al. (2012) show that both cultural diversity and diversity in educational attainment within firms is positively associated with employees' likelihood to become entrepreneurs.

While replicative entrepreneurship also relies on some knowledge (i.e. of an existing business model to replicate) as well as on an opportunity, both the Kirznerian and the knowledge spillover perspectives emphasise the exploitation of "overlooked" opportunities or those caused by new ideas, which we would define as innovation-oriented entrepreneurship. In this sense, cultural diversity increases exposure to variety, which could thus trigger potential entrepreneurs and particularly individuals who are oriented at innovation - the ones who are interested in 'new combinations' (Schumpeter). Simply put: a large heterogeneity of products, markets, processes, offers a mosaic of customer niches, behaviors, ideas, services and products to recombine, and processes to refine and apply – in short, offers many opportunities for new businesses and in particular, novel business ideas.

Diversity in agents and diversity in regional business opportunities are closely related. The 'individual-opportunity nexus' concept stresses that cognitive capacity is a necessary condition for discerning opportunities in the first place; an insight also Kirzner shared in his later work (McMullen & Shepherd 2006). This suggests that some individuals are more capable to identify entrepreneurial opportunities, and upon evaluation, to pursue and exploit them. Moreover, in order to identify such opportunities deriving from cultural diversity, individuals need to be able to interpret and make use of the knowledge they receive from heterogeneous sources, indicating that using cultural diversity may require absorptive capacity (Cohen & Levinthal, 1990). This suggests that an individual's education level may affect their capability to use cultural diversity in the identification and eventual pursuit of innovative business ideas. Moreover, while diversity may increase the amount of heterogeneous knowledge and thus the potential of innovation, there could be diminishing returns due to increasing cognitive distance (Nooteboom et al., 2007). Thus, specific types or extents of cultural diversity may be more easily accessible for innovative processes and too much diversity may even create challenges. Potential costs of diversity, such as communication difficulties or other frictions may hinder innovation and seem to feature more prominently in literature considering measures of ethnic rather than cultural diversity and especially in global cross-country comparisons (e.g. Alesina & La Ferrara, 2005; Awaworyi Churchill, 2017).

This brings us to the third theoretical linkage between cultural diversity and innovative entrepreneurship: cultural diversity as *an attractive force for innovative entrepreneurial talent*. Building on Florida's (2002) arguments that highly-skilled and creative individuals are attracted by diverse and open-minded places, regions characterised by cultural diversity may signal knowledge spillovers and attract potential entrepreneurs. Moreover, tolerance may also facilitate knowledge exchange among heterogeneous groups because it could lower barriers to communication and thus increase the potential for spillovers (Schmutzler & Lorenz, 2018). Empirical studies thus far show different results. Lee, Florida and Acs (2004) argue that diversity fosters innovation because diverse regions attract individuals with unconventional ideas, although their findings are significant only for the share of same-sex couples and not for cultural diversity in terms of foreign population. Qian (2013) cautions against equating the

concepts of tolerance and diversity as only a direct positive effect for the latter on entrepreneurship was found, next to positive indirect effects of the former on both entrepreneurship and innovation. Mickiewicz et al. (2019) find that peoples' exposure to diverse groups and communities (ethnic pluralism) may spur entrepreneurship and innovation and argue that this is due to values of tolerance and experimentation. The potential role of institutions as moderating factors in the relationship between cultural diversity and entrepreneurship is emphasised by Awaworyi Churchill (2017) who finds a negative effect of ethnic heterogeneity on entrepreneurship in a global cross-country analysis and explains this with high levels of fractionalisation potentially undermining trust and social networks. More generally, considering institutional contexts and diversity jointly raises issues of endogeneity, since it is not clear whether diverse population is attracted to certain institutional frameworks or whether informal institutions evolve in response to changing population compositions.

Overall, the theoretical and empirical literature suggests that diversity has the potential to increase not only rates of new firm formation generally but that it could also enable innovative entrepreneurship specifically. Thus, we may expect regions with more cultural diversity to record higher prevalence of innovation-oriented rather than replication-oriented entrepreneurship.

H1: Regional cultural diversity is positively associated with the likelihood of innovation-orientation among entrepreneurs.

Since innovation derived from cultural diversity implies that opportunity needs to be recognised and diverse knowledge needs to be accessed and applied, the effect of cultural diversity on innovation-oriented entrepreneurship may vary for specific types of cultural diversity. In particular, if cognitive proximity is a relevant factor in translating diversity into innovation, diversity from relatively more "distant" cultural backgrounds may be more difficult to convert to, or could even hamper, innovation.

H2: Regional cultural diversity has a lower effect on the likelihood of innovation-orientation when the foreign-born population is from non-EU countries rather than from other EU countries.

Besides the origin of a region's foreign-born population, a further relevant dimension may be its human capital endowment. On the one hand, if the foreign-born population is relatively more highly educated, their human capital itself may stimulate innovation. On the other hand, more highly educated foreign-born population may be able to bridge cultural differences more easily and thus facilitate the transfer and uptake of innovative entrepreneurial ventures.

H3: Regional cultural diversity is more likely to be associated to innovation-orientation when the educational attainment level of the regional foreign-born population is higher.

However, human capital may not only be relevant in terms of the foreign-born population but also in enabling entrepreneurs themselves to recognise and act upon innovative stimuli derived from cultural diversity. Thus, the innovative effects of cultural diversity may depend on entrepreneurs' absorptive capacity, i.e. their competences to identify and pursue such opportunities, as proxied here by educational attainment.

H4: The effect of cultural diversity on the likelihood of innovation-orientation is positively moderated by the educational attainment level of the entrepreneur.

3 DATA AND METHODS

3.1 DATA

Dependent variable

Entrepreneurship rates are taken from the Global Entrepreneurship Monitor (GEM), a representative annual survey of adult population on topics such as entrepreneurial activity and perceptions of entrepreneurship (Reynolds et al. 2005). The GEM data allows identifying individuals involved in Early-stage Entrepreneurial Activity (ESEA), which includes nascent entrepreneurs and owners of businesses younger than 3.5 years. Early-stage entrepreneurs who consider their goods or services unfamiliar to at least some customers and expect few or no competitors (as opposed to many competitors) are classified as innovation-oriented. Otherwise, the respondents are considered replication-oriented entrepreneurs. It should be emphasised here that we measure self-reported innovation-orientation and therefore cannot distinguish whether individuals are truly more innovation-oriented or whether they may differ in their self-perception of being innovative, as expressed in the survey. Besides entrepreneurial activity and business orientation, the GEM dataset also covers general individual characteristics such as gender, age, educational attainment, occupational status and household income.

For our analysis, we are interested in the role of regional characteristics on individual respondents' business orientation which is why we consider their geographical location in terms of sub-national regions within Europe. It should be noted that, due to sample sizes, the regional unit of analysis corresponds to NUTS 2 regions in most countries and NUTS 1 regions in others. Pooling the GEM surveys for the years 2006 to 2014 and excluding observations with missing values, we have information on 39,627 individuals across 166 regions and 25 European countries. Of these, 10,927 (27.6%) are categorised as innovation-oriented early-stage entrepreneurs, whereas the remaining 28,700 (72.4 %) are replication-oriented.

Independent variables

Although the broad geographic coverage of the GEM data is an advantage, it also causes challenges in terms of operationalising cultural diversity. While cultural diversity data e.g. in terms of ethnic composition or detailed country-of-birth statistics is available for some countries, regional availability of these variables is very limited and comparability across countries even more so. The most widely available unified indicator refers to share of foreign-born population per region, which was captured in the European Population and Housing census in 2011[1]. This data source also allows distinguishing foreign-born population by education level[2] as well as whether they were born in another country within or outside the European Union.

Share of foreign population is likely to be indicative of cultural diversity but it is clearly an imperfect measure. Nevertheless, it is widely applied in the literature (e.g. Audretsch et al., 2021; Lee et al., 2004)

[1] Besides foreign-born population, foreign population by citizenship is available. While both conceptualisations have drawbacks, citizenship raises issues of second-generation immigrants potentially being counted as "foreign" due to some countries assigning citizenship based on parental citizenship. Since we conceptualise cultural diversity for the purpose of capturing diverse knowledge and experiences, we hope that country of birth is a slightly more reliable indicator. However, being born in another country of course does not guarantee a cultural background different to their country of residence just as cultural background is not guaranteed to be homogenous among individuals with the same citizenship.

[2] We distinguish "high" and "low" educational attainment among the foreign-born population. "High" educational attainment refers to at least ISCED 5, i.e. a completed tertiary degree of any type. "Low" educational attainment is defined here as ISCED 1 or ISCED 2, i.e. primary education or a lower secondary education degree.

due to its simplicity and when data for more detailed diversity indicators is not available. In order to broaden our analysis, we consider a few alternative specifications of diversity that rely on operationalising differences among population groups, keeping in mind the strong data limitations that we face.

A fractionalisation index captures the probability that two randomly selected individuals differ in their cultural backgrounds and is usually calculated based on a full range of country of birth or ethnicity variables.

$$F_i = 1 - \sum_{k=1}^{k} s_{ik}^2$$

Here, we implement a simplified version that considers only the shares (s_i) per region across the three groups of "native population", "born in another EU country" and "born in a non-EU country". Generally, F increases with the number of distinct population groups as well as their size. However, since the number of groups is fixed at three here for all regions, the only variation in F is due to different relative sizes of the shares of native, foreign-EU and foreign-non-EU population.

Since the fractionalisation index tends to overweigh large groups (Niebuhr & Peters, 2020), we also calculate a Theil entropy index:

$$T_i = -\sum_{k=1}^{K} s_{ik} \ln(s_{ik})$$

To obtain an index between 0 and 1, we normalise $T_i$by dividing by ln(K=3). The Theil index is maximised when all three shares are equal, i.e. 1/3 of the population is native born, a 1/3 is from another EU country and the last 1/3 was born in a non-EU country.

To further broaden our measure of diversity and conduct robustness checks of our results using more encompassing data, we also obtained diversity measures from alternative sources. We thus consider the birthplace diversity index by Alesina, Harnoss and Rapoport (2016), which is a fractionalisation index based on migration stock data originally used by Artuc et al. (2015). To implement a different notion of diversity entirely, we also consider the Historical Index of Ethnic Fractionalisation (Drazanova, 2020) and the Index of Ethnic Linguistic Fractionalisation (ELF-6) (Desmet et al., 2012).

3.2 METHODS

Besides our main variable of interest, the different operationalisations of cultural diversity, we include control variables for a range of other aspects that may affect innovative entrepreneurship at both the individual and the regional level. These include individual characteristics such as gender, education level, employment status and household income. Additionally, we consider regional-level characteristics capturing regional economic (GDP per capita, unemployment rate, share of manufacturing employment) and innovative conditions (share of population with tertiary education, R&D spending, patent application per capita) as well as demographic circumstances (population density, share of population aged 18-34) all obtained from Eurostat. Moreover, we use the GEM survey to calculate indicators for regional entrepreneurial attitude (or culture) referring, for instance, to the share of all respondents who know an entrepreneur, think of themselves as having the skills to be an entrepreneur or consider fear of failure a deterrent from entrepreneurship. The latter indicators are proxies of regional institutional framework conditions. A full list of all variables in our multilevel approach and the summary statistics are presented in the appendix.

Our dependent variable is binary: 1 if the respondent is an innovation-oriented early-stage entrepreneur and 0 otherwise. Since we are interested in the relative prevalence of innovation- vs. replication-oriented early-stage entrepreneurs and wish to include individual, regional and national characteristics, we specify the model as a multilevel logistic regression with random intercepts at the region and country level. Since we pool the GEM data across the years 2006 to 2014 to ensure adequate sample size and maximum geographic coverage, we also include year fixed effects based on the year of the survey to account for differences in the GEM data over time.

In line with the notion that there may be costs and benefits to diversity and some previous studies (Awaworyi Churchill, 2017; Mickiewicz et al., 2019; Sobel et al., 2010) we also test for a potential non-linear effect of diversity by including a squared Theil index. Moreover, we introduce a cross-level interaction between diversity and high individual educational attainment (post-secondary or above) in order to test whether more highly educated early-stage entrepreneurs have an advantage in identifying new opportunities arising from culturally diverse regions, resulting in innovation-oriented new businesses.

4 RESULTS

4.1 DESCRIPTIVE ANALYSIS

Figure 1 illustrates the geographic distribution of early-stage entrepreneurship generally alongside the share of innovation-orientation across European regions. As expected, there are clear geographic differences in the prevalence of early-stage entrepreneurship between but also within countries, with higher ESEA rates occurring especially in Eastern Europe. While innovation-orientation also differs geographically, it is clear that the pattern is distinct from the overall prevalence of entrepreneurship: regions with relatively high shares of early-stage entrepreneurs do not necessarily have more innovative entrepreneurship. Indeed, there is no significant correlation among these two shares (r = 0.0468) indicating that innovation-orientation represents a qualitatively different dimension of entrepreneurship rather than simply reflecting its quantitative extent.

Figure 1: Rate of early-stage entrepreneurship (left) and share of innovation-orientation among ESEA (right)

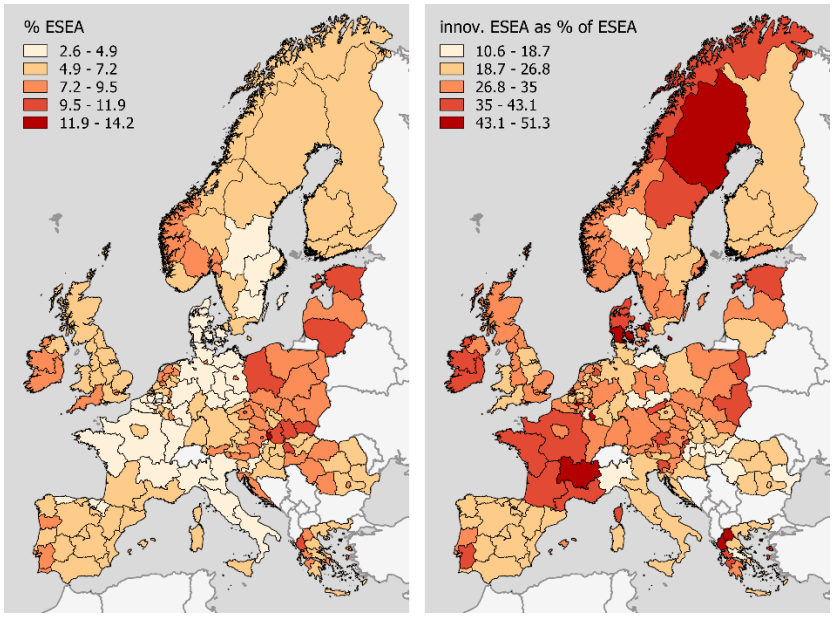
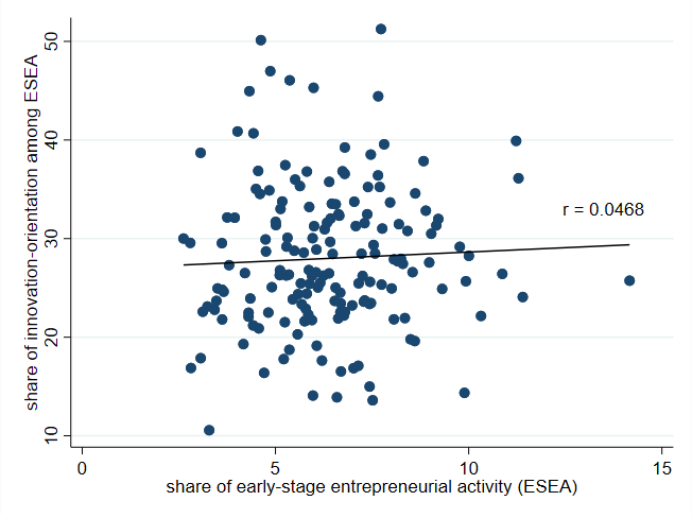
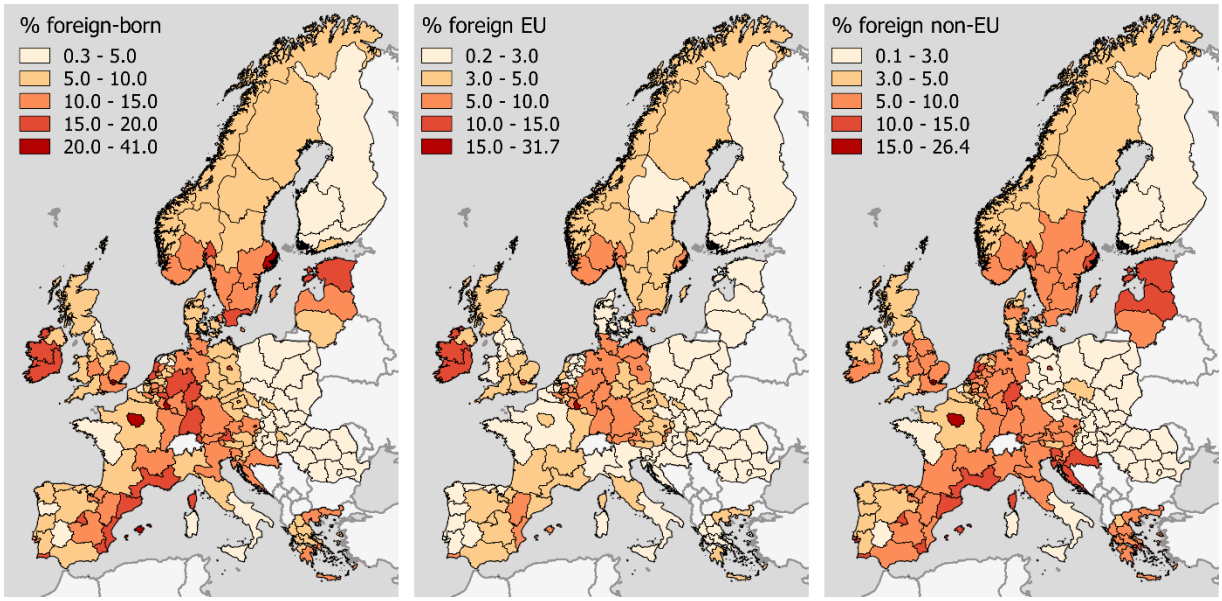


Figure 2: Correlation between share of ESEA and share of innovation-orientation among ESEA



Cultural diversity also shows distinct geographic patterns. Overall, it is clear that capital and economic core regions have higher shares of foreign-born population. Disaggregating this indicator further by EU and non-EU native country shows that the share of non-EU foreign-born population is concentrated especially in capital regions (e.g. Paris, Berlin, Amsterdam) but also in peripheral and border regions (e.g. Southern France, Croatia and the Baltic States). This finding illustrates the large heterogeneity within the category of non-EU born foreigners and is likely evidence of further sorting mechanisms by origin or skill-level. In contrast, a high share of foreign population born in other EU countries, but not non-EU countries is evident for instance in Ireland, Luxembourg and East Germany.

Figure 3:Share of foreign-born population overall (left), share of population born in another EU country (middle), share of population born in a non-EU country (right)



4.2 BASELINE RESULTS

The results for the baseline regression are presented in table 1. The null model (column 1) as well as all other models demonstrate the relevance of variation at the country level, which exceeds the remaining variation at the regional level. In fact, the intraclass correlation calculation reveals that the country level alone explains 2.83% of the total variation, whereas considering regions clustered in countries explains 2.98%. The result confirms our decision to consider a multilevel specification and use country-level random intercepts in addition to controlling for local regional characteristics.

The share of foreign-born population is significantly positive indicating that early-stage entrepreneurs in regions with a higher share of foreign population are more likely to report innovation-orientation. When decomposing the overall share of foreign-born into those born in other EU countries and those born in non-EU countries, only the share of EU-born foreigners remains significant and positive. Thus, while foreign-born population is in general associated with a greater propensity for innovative rather than replicative entrepreneurship, this effect seems to attributable more strongly to EU-foreigners. This result is in line with the notion that a potentially smaller cognitive distance among cultural backgrounds within the geographic region of the European Union could facilitate uptake of innovative ideas. However, it should be noted that the coefficient for foreign-born population from non-EU countries is insignificant rather than negative: while a larger proportion of non-EU foreigners in a region does not seem to increase the likelihood of innovative entrepreneurship, it also does not hinder it.

It could be argued that the apparent beneficial effect of cultural diversity on the likelihood of innovative entrepreneurship is simply due to the level of human capital (i.e. education, skills or expertise) in diverse populations rather than its inherent variety. To test this hypothesis, columns 4 to 7 show a variety of decompositions by country group of origin (EU vs. non-EU foreign born population) as well as the skill level of the foreign population (high vs. low educational attainment). Column 4 considers the effect of the regional share of foreign population with high as well as low educational attainment on the likelihood of innovative versus replicative entrepreneurship. Neither of these variables emerge as significant separately or when additionally controlling for the share of population born in other EU or non-EU countries (columns 5 and 6). Column 7 presents a more detailed decomposition, considering simultaneously the relative sizes of both the population groups born in other EU and non-EU countries and the relative prevalence of high and low educational degrees among them. Again, the share of population born in other EU countries significantly increases the likelihood that an individual engages in innovative entrepreneurship. However, interestingly, among EU-foreign-born, a higher share of high education but also of low education is associated with a higher probability of innovative rather than replicative entrepreneurship. Neither the share of non-EU-foreign-born population, nor the relative prevalence of high or low educational degrees among them emerges as significant in explaining the likelihood of innovative start-ups. Jointly, the results show a robust significant effect for the share of foreign-born population, emphasising particularly the role of EU-born foreigners in potentially supporting innovation among entrepreneurs. Simultaneously, the education-level of foreign population seems to be less relevant and we do not find differential impacts of high versus low educational attainment.

Besides our variable of interest, cultural diversity, the control variables also hold some interesting conclusions for the relative prevalence of innovative entrepreneurial ventures. The individual-level variables largely confirm expectations derived from the literature. The probability that an early-stage entrepreneur engages in innovative rather than replicative behaviour decreases with age, increases with education and is relatively lower for individuals who are in employment. Education may yield innovative business ideas, while age and employment status could indicate the effect of opportunity costs or willingness and ability to take on risks. In contrast, we do not find a gender difference in the type of entrepreneurship and only small differences with respect to household income.

While the economic and demographic regional conditions do not seem to explain differences in the likelihood of innovative versus replicative entrepreneurship, the results in table 1 provide some evidence for the relevance of regional knowledge spillovers: individuals in regions with comparatively high R&D spending have a higher probability of engaging in innovative rather than replicative entrepreneurship. However, the regional human capital availability shows a small but opposite effect as replicative entrepreneurship increases in likelihood with the share of tertiary degrees in the population. Hypothetically, regions with a high share of tertiary degrees may offer employment opportunities that are especially attractive for innovative individuals, causing a higher relative share of replicative entrepreneurs, although we cannot test this idea in the current analysis.

In terms of regional attitudes towards entrepreneurship, the share of people who consider fear of failure an obstacle is associated with an increased likelihood of innovative orientation among individual entrepreneurs, while the share of people who consider themselves to have the necessary skills for entrepreneurship decreases the likelihood. While the former effect seems counterintuitive at first glance, it may indicate an underlying selection mechanism among entrepreneurs in risk-averse regions. Individuals who choose to become entrepreneurs despite a regional-level cultural attitude of risk-avoidance may have identified a particularly valuable, and likely innovative, opportunity. In more cautious environments it may therefore only be the particularly innovative individuals who decide to engage in early stage entrepreneurial activity altogether. The second finding could imply that in regions with great faith in possessing entrepreneurial skills, individuals aspiring entrepreneurship more often compare themselves to incumbent entrepreneurs and existing business ideas, thus judging their entrepreneurial venture to be more replicative. Especially considering that we rely on entrepreneurs' self-assessment of innovation here, these results hint at complex interactions between individuals' true and perceived innovativeness and the regional-level attitudes toward entrepreneurship.

Table 1: Multilevel logistic regression of innovative vs. replicative entrepreneurship

dep. var	innovative vs. replicative	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Diversity	share foreign-born		1.055**					
			(0.4417)					
	sh. foreign: EU-born			2.037***		2.157***	1.841**	2.170***
				(0.7676)		(0.7792)	(0.7632)	(0.7592)
	sh. foreign: non-EU-born			0.412		0.432	0.635	0.405
				(0.6060)		(0.6760)	(0.6195)	(0.6999)
	sh. foreign: high educ				0.715			
					(1.1055)			
	sh. foreign: low educ				1.431			
					(1.0620)			
	sh. EU-born, high- educ					0.388		0.859*
						(0.3700)		(0.4450)
	sh. non-EU-born, high- educ					0.127		-0.265
						(0.3881)		(0.6319)
	sh. EU-born, low- educ						0.264	0.654*
							(0.3038)	(0.3615)
	sh. non-EU-born, low- educ						-0.451	-0.450
							(0.3083)	(0.5152)
individual factors	female		-0.004	-0.004	-0.004	-0.004	-0.003	-0.004
			(0.0237)	(0.0237)	(0.0237)	(0.0237)	(0.0237)	(0.0237)
	age		-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
			(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
education	some secondary		0.327***	0.327***	0.327***	0.329***	0.326***	0.329***
base: no degree			(0.1186)	(0.1186)	(0.1186)	(0.1186)	(0.1186)	(0.1186)
	secondary degree		0.455***	0.456***	0.455***	0.458***	0.456***	0.459***
			(0.1164)	(0.1164)	(0.1164)	(0.1164)	(0.1164)	(0.1164)
	post-secondary		0.650***	0.650***	0.650***	0.652***	0.650***	0.653***
			(0.1162)	(0.1162)	(0.1162)	(0.1162)	(0.1162)	(0.1162)
	graduate experience		0.875***	0.875***	0.875***	0.878***	0.875***	0.879***
			(0.1182)	(0.1182)	(0.1182)	(0.1182)	(0.1182)	(0.1182)
work status	not working		0.236***	0.236***	0.236***	0.236***	0.236***	0.236***
base: full/part-time			(0.0437)	(0.0437)	(0.0437)	(0.0437)	(0.0437)	(0.0437)
	retired/student		0.362***	0.362***	0.362***	0.363***	0.362***	0.363***
			(0.0624)	(0.0624)	(0.0624)	(0.0624)	(0.0624)	(0.0624)
income group	lowest tertile		0.161***	0.161***	0.161***	0.162***	0.161***	0.161***
base: n/a			(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)
	middle tertile		0.152***	0.152***	0.152***	0.151***	0.152***	0.151***
			(0.0358)	(0.0358)	(0.0358)	(0.0358)	(0.0358)	(0.0358)
	highest tertile		0.181***	0.181***	0.181***	0.181***	0.181***	0.180***
			(0.0338)	(0.0338)	(0.0338)	(0.0338)	(0.0338)	(0.0338)
regional factors	Ln GDP p.c.		0.084	0.052	0.098	0.036	0.092	0.046
			(0.0860)	(0.0875)	(0.0872)	(0.0894)	(0.0905)	(0.0916)
	unemployment		0.072	0.098	0.185	-0.121	0.083	-0.182
			(0.6263)	(0.6259)	(0.6286)	(0.6240)	(0.6190)	(0.6118)
	manuf. employment		-0.623*	-0.548	-0.640*	-0.433	-0.486	-0.428
			(0.3539)	(0.3580)	(0.3591)	(0.3532)	(0.3580)	(0.3521)
	pop density		-0.000*	-0.000	-0.000	-0.000	-0.000	-0.000
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	share pop aged 18-34		-0.841	-0.706	-0.778	-0.761	-1.119	-1.013
			(1.0741)	(1.0712)	(1.1020)	(1.0722)	(1.0984)	(1.0742)
	share pop with tertiary educ		-0.701*	-0.607	-0.680*	-0.863**	-0.757*	-0.810**
			(0.3793)	(0.3814)	(0.4042)	(0.4062)	(0.4050)	(0.3986)
	R&D spending % of GDP		0.050**	0.051**	0.052**	0.048**	0.050**	0.050**
			(0.0246)	(0.0247)	(0.0251)	(0.0241)	(0.0246)	(0.0240)
	Patents per capita		-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
			(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0003)
entpren. attitudes	share „fear of failure“		1.410***	1.208**	1.420***	1.270**	1.102**	1.164**
			(0.5135)	(0.5194)	(0.5180)	(0.5065)	(0.5136)	(0.5068)
	share „know entrepreneur“		0.799	0.688	0.655	0.817	0.754	0.659
			(0.7533)	(0.7487)	(0.7558)	(0.7285)	(0.7516)	(0.7221)
	share „opportunities“		0.862*	0.951*	0.932*	0.779	0.895*	0.848*
			(0.4989)	(0.4988)	(0.5037)	(0.4949)	(0.5080)	(0.4945)
	share „skills“		-2.297***	-2.110***	-2.195***	-2.183***	-2.090***	-2.001***
			(0.5445)	(0.5547)	(0.5423)	(0.5338)	(0.5624)	(0.5373)
	Constant	-0.900***	-2.278**	-2.010**	-2.429**	-1.903**	-2.188**	-2.016**
		(0.0643)	(0.9352)	(0.9409)	(0.9441)	(0.9501)	(0.9518)	(0.9449)
	var(_cons[country])	0.096***	0.049***	0.044***	0.049***	0.042***	0.041***	0.037***
		(0.0301)	(0.0169)	(0.0155)	(0.0174)	(0.0148)	(0.0149)	(0.0135)
	var(_cons[country>NUTSID])	0.005	0.001	0.002	0.002	0.001	0.001	0.001
		(0.0032)	(0.0023)	(0.0023)	(0.0024)	(0.0023)	(0.0023)	(0.0023)
	LR test vs. logistic	394.6***	129.5***	125.7***	119.8***	107.4***	96.77***	83.36***
	Observations	39,627	39,627	39,627	39,627	39,627	39,627	39,627

Random intercepts for NUTS-regions and countries, survey-year fixed effects, standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.3 ALTERNATIVE DIVERSITY MEASURES AND EXTENSIONS

While the population shares used to capture cultural diversity in the baseline analysis already indicate its relevance for innovation-orientation of early-stage entrepreneurs, these measures constitute only rough proxies of cultural diversity. As an extension, table 2 presents the results for alternative operationalisations of cultural diversity and shows that more sophisticated indicators of diversity yield comparable results. Both the fractionalisation and Theil index (columns 1 and 2) show that in regions with a more diverse overall population (i.e. where the three groups (native, EU-born, non-EU-born) are relatively more equal in size) entrepreneurs are more likely to be innovation-oriented.

In contrast to Sobel et al. (2010), who analysed the effect of cultural diversity on entrepreneurship rates for US states, including a squared term for the Theil index to account for potential non-linear relationship shows no diminishing effect of diversity at higher levels. Instead, the squared term is slightly significantly positive, which may even imply increasing innovative benefits with higher diversity. Thus, in our results, increasing heterogeneity does not seem to eventually have a negative effect on innovation, e.g. through communication issues among groups, but rather shows a consistently positive association with the likelihood of innovation-oriented early-stage entrepreneurship.

Columns 5 to 7 present estimations using three different national-level measures of diversity obtained from previous literature. These indicators present richer operationalisations of cultural diversity but are not available at sub-national levels. In column 5, we include the national-level fractionalisation index of birthplace diversity presented by Alesina et al. (2016). As in our baseline results using share of foreign population and a rough diversity indicator at the regional level, in our extended analyses we also find a strongly significant effect of diversity on the likelihood of being innovation rather than replication-oriented. Especially considering that the national level seems to explain a larger share of the individual variation than the regional level, the confirmation of our regional-level diversity effects with a more detailed national-level diversity indicator further supports our results.

In contrast, the two other diversity indicators implemented in columns 5 and 6 are not significant. Column 5 uses the HIEF measure based on ethnic fractionalisation (Drazanova, 2020) and column 6 refers to a linguistic fractionalisation index presented by Desmet et al. (2012). These measures are again defined at the national rather than the regional level and it is not clear whether ethnic and linguistic differences offer sufficient variation to exploit for a cross-European analysis as for comparable global studies.

As a last step, the results in table 3 test whether the effect of cultural diversity depends on individuals' education level. We introduce a cross-level interaction between a dummy variable identifying individuals with at least post-secondary education and the regional share of foreign-born population (column 1) and for the regional Theil-Index (column 2). In both specifications, the interaction effect is insignificant indicating that more highly educated individuals do not seem to have an advantage in translating cultural diversity into innovative business ideas. Thus, cultural diversity seems to inspire entrepreneurs towards innovative ventures regardless of their educational attainment. This result, surprisingly, contradicts the hypothesis that a certain skill or education level is required to be able to translate regional cultural diversity into innovative ideas as would be expected from perspectives of absorptive capacity. Instead, we find no differential impact of the role of regional cultural diversity by individual educational attainment.

Table 2: Results for different implementations of diversity measures

dep. var	innovative vs. replicative	(1)	(2)	(3)	(4)	(5)	(6)
Diversity	fractionalisation 3 groups	0.621**					
		(0.2905)					
	Theil-Index (normalised)		0.396**	-0.590			
			(0.1996)	(0.6181)			
	squared Theil-index			1.304*			
				(0.7750)			
	national-level birthplace diversity (AHR)				1.124***		
					(0.3443)		
	HIEF (Drazanova)					0.505	
						(0.3290)	
	ELF (Desmet et al.)						0.111
							(0.2752)
individual factors	female	-0.004	-0.004	-0.004	-0.006	-0.000	-0.004
		(0.0237)	(0.0237)	(0.0237)	(0.0239)	(0.0240)	(0.0237)
	age	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
		(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
education	some secondary	0.327***	0.327***	0.328***	0.324***	0.305**	0.327***
base: no degree		(0.1186)	(0.1186)	(0.1186)	(0.1193)	(0.1227)	(0.1186)
	secondary degree	0.455***	0.456***	0.456***	0.444***	0.444***	0.456***
		(0.1164)	(0.1164)	(0.1164)	(0.1171)	(0.1205)	(0.1164)
	post-secondary	0.650***	0.650***	0.651***	0.644***	0.637***	0.651***
		(0.1162)	(0.1162)	(0.1162)	(0.1169)	(0.1203)	(0.1162)
	graduate experience	0.875***	0.875***	0.876***	0.863***	0.858***	0.875***
		(0.1182)	(0.1182)	(0.1182)	(0.1189)	(0.1223)	(0.1182)
work status	not working	0.236***	0.236***	0.236***	0.236***	0.245***	0.236***
base: full/part-time		(0.0437)	(0.0437)	(0.0437)	(0.0441)	(0.0444)	(0.0437)
	retired/student	0.362***	0.362***	0.362***	0.370***	0.382***	0.363***
		(0.0624)	(0.0624)	(0.0624)	(0.0633)	(0.0637)	(0.0624)
income group	lowest tertile	0.161***	0.161***	0.160***	0.155***	0.155***	0.162***
base: n/a		(0.0384)	(0.0384)	(0.0384)	(0.0387)	(0.0389)	(0.0384)
	middle tertile	0.152***	0.152***	0.152***	0.150***	0.144***	0.153***
		(0.0358)	(0.0358)	(0.0358)	(0.0360)	(0.0361)	(0.0358)
	highest tertile	0.181***	0.181***	0.181***	0.170***	0.177***	0.182***
		(0.0338)	(0.0338)	(0.0338)	(0.0341)	(0.0341)	(0.0338)
regional factors	Ln GDP p.c.	0.093	0.092	0.101	0.151*	0.120	0.164**
		(0.0865)	(0.0881)	(0.0874)	(0.0833)	(0.0841)	(0.0814)
	unemployment	0.054	0.044	0.239	-0.030	0.127	0.314
		(0.6340)	(0.6407)	(0.6467)	(0.6590)	(0.6496)	(0.6361)
	manuf. employment	-0.626*	-0.623*	-0.603*	-0.498	-0.557	-0.620*
		(0.3549)	(0.3563)	(0.3540)	(0.3753)	(0.3616)	(0.3600)
	pop density	-0.000	-0.000	-0.000**	-0.000	-0.000	-0.000
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	share pop aged 18-34	-0.815	-0.761	-0.844	0.571	0.272	-0.217
		(1.0822)	(1.0843)	(1.0788)	(1.0783)	(1.0495)	(1.0613)
	share pop with tertiary educ	-0.727*	-0.728*	-0.624	-0.996***	-0.900**	-0.848**
		(0.3816)	(0.3843)	(0.3854)	(0.3637)	(0.4019)	(0.3883)
	R&D spending % of GDP	4.796*	4.733*	5.365**	5.405**	5.333**	4.869*
		(2.4664)	(2.4750)	(2.4902)	(2.4558)	(2.4862)	(2.4913)
	Patents per capita	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
entpren. attitudes	share „fear of failure“	1.474***	1.491***	1.281**	1.381***	1.185**	1.449***
		(0.5190)	(0.5227)	(0.5310)	(0.4764)	(0.5420)	(0.5373)
	share „know entrepreneur“	0.863	0.892	0.561	0.398	0.400	0.526
		(0.7660)	(0.7752)	(0.7951)	(0.7075)	(0.7646)	(0.7637)
	share „opportunities“	0.831*	0.826	0.936*	0.788	1.055**	0.907*
		(0.5026)	(0.5049)	(0.5054)	(0.4872)	(0.5026)	(0.5091)
	share „skills“	-2.341***	-2.347***	-2.177***	-1.760***	-1.884***	-2.084***
		(0.5493)	(0.5524)	(0.5648)	(0.5226)	(0.5661)	(0.5544)
	Constant	-2.381**	-2.417**	-2.290**	-3.318***	-2.896***	-3.148***
		(0.9369)	(0.9429)	(0.9391)	(0.9263)	(0.9246)	(0.8932)
	var(_cons[country])	0.050***	0.051***	0.049***	0.035***	0.044***	0.056***
		(0.0175)	(0.0178)	(0.0173)	(0.0129)	(0.0160)	(0.0192)
	var(_cons[country>NUTSID])	0.001	0.002	0.001	0.002	0.001	0.002
		(0.0023)	(0.0023)	(0.0023)	(0.0024)	(0.0024)	(0.0024)
	LR Test stat (chi sq)	133.5***	135.8***	133.1***	91.85***	108.9***	138.8***
	Observations	39,627	39,627	39,627	38,715	38,671	39,627

Random intercepts for NUTS-regions and countries, survey-year fixed effects, standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Interaction results for entrepreneurs' educational attainment

dep. var	innovative vs. replicative	(1)	(2)
Diversity	share foreign-born	1.191***	
		(0.4467)	
	share foreign-born*ind_educ_high	-0.405	
		(0.3975)	
	Theil-Index (normalised)		0.468**
			(0.2018)
	Theil-Index*ind_educ_high		-0.259
			(0.1861)
individual factors	female	0.007	0.007
		(0.0236)	(0.0267)
	age	-0.004***	-0.004***
		(0.0010)	(0.0009)
education	individual_educ_high	0.425***	0.472***
		(0.0534)	(0.0725)
work status	not working	0.231***	0.231***
base: full/part-time		(0.0436)	(0.0436)
	retired/student	0.352***	0.353***
		(0.0623)	(0.0623)
income group	lowest tertile	0.148***	0.148***
base: n/a		(0.0383)	(0.0383)
	middle tertile	0.154***	0.155***
		(0.0357)	(0.0357)
	highest tertile	0.204***	0.205***
		(0.0337)	(0.0337)
regional factors	Ln GDP p.c.	0.087	0.095
		(0.0846)	(0.0868)
	unemployment	0.153	0.127
		(0.6170)	(0.6319)
	manuf. employment	-0.613*	-0.612*
		(0.3497)	(0.3522)
	pop density	-0.000*	-0.000
		(0.0000)	(0.0000)
	share pop aged 18-34	-0.980	-0.887
		(1.0614)	(1.0720)
	share pop with tertiary educ	-0.522	-0.549
		(0.3740)	(0.3794)
	R&D spending % of GDP	4.757*	4.473*
		(2.4469)	(2.4591)
	Patents per capita	-0.000	-0.000
		(0.0002)	(0.0002)
entpren. attitudes	share „fear of failure“	1.359***	1.439***
		(0.5048)	(0.5147)
	share „know entrepreneur“	0.757	0.858
		(0.7437)	(0.7658)
	share „opportunities“	0.879*	0.836*
		(0.4933)	(0.4996)
	share „skills“	-2.341***	-2.397***
		(0.5326)	(0.5410)
	Constant	-1.808**	-1.961**
		(0.9130)	(0.9212)
	var(_cons[country])	0.046***	0.049***
		(0.0161)	(0.0170)
	var(_cons[country>NUTSID])	0.001	0.001
		(0.0022)	(0.0022)
	LR Test stat (chi sq)	124.3***	129.9***
	Observations	39,627	39,627

Random intercepts for NUTS-regions and countries, survey-year fixed effects, standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5 DISCUSSION AND CONCLUSION

This paper investigated how the likelihood that individuals engage in innovation-oriented entrepreneurship varies with regional cultural diversity across European regions. We argued and identified descriptive evidence that innovation-oriented entrepreneurship is not just a corollary of early-stage entrepreneurship generally but that it shows distinct geographic patterns, suggesting that different contexts, drivers and mechanisms are at play. In general, and throughout all our results, regional cultural diversity, whether measured simply as share of foreign-born population or using different fractionalisation indices, emerges as significantly and strongly positive factor in explaining the probability of an early-stage entrepreneur to exhibit innovation-orientation. These robust positive empirical results thus support the theoretical expectations of, e.g. the resource-based approach or the knowledge spillover theory, that regional diversity stimulates innovation.

While diversity overall seems to be conducive for innovation, we find differences in terms of the national background of foreign-born population. The share of foreign-born population from other EU countries is significantly positive for the likelihood of innovation-orientation among early-stage entrepreneurs while the foreign-born population from non-EU countries is insignificant. Two aspects stand out in interpreting this result. First, the positive effect for the share of EU-migrants may be indicative of the moderating role of cognitive or institutional proximity (cf. Boschma, 2005) in deriving innovation from diversity. Without neglecting the substantial intra-EU national and cultural differences, shared languages, values, norms, as well as smaller geographic distances and thus exchange via markets and travel but also institutional agreements and standards likely imply more common ground among people born in the European Union. This proximity may facilitate communication and knowledge transfer, implying that early-stage entrepreneurs may more easily find inspiration, innovation and opportunities in this type of diversity, in line with principles of an "optimal" cognitive distance (Nooteboom et al., 2007). Second, however, the share of foreign population born in non-EU countries is not negative but insignificant in explaining innovation-orientation among early-stage entrepreneurs. Thus, despite a potentially larger cognitive or institutional distance, a large share of population born in non-EU countries does not imply less innovation, but rather does not seem to influence likelihood of replicative versus innovative early-stage entrepreneurship in any way. While this might hint at relative difficulties in accessing knowledge transfer in cases of lacking proximities, it should also be noted that the category of non-EU countries is very broad and hides extensive heterogeneity. Depending on local contexts, history, and institutions, cognitive distance between local and foreign-born population may vary tremendously within the group of non-EU countries. Thus, the insignificant result across all European regions could in principle contain geographically differentiated positive and negative trends, which could only be disentangled with more detailed information on the origin countries of foreign-born population.

In contrast to the strong and robust effects for cultural diversity overall, education aspects generally seem less relevant in explaining innovation-orientation among early-stage entrepreneurs. In contrast to the expectation that more highly educated migrants could increase knowledge spillovers and thus innovation, the education level of foreign population in the region has no significant impact on the likelihood of entrepreneurs to be innovation-oriented. Thus, the positive effect of cultural diversity on innovative entrepreneurship does not seem education-related but rather stems from the cultural background itself. In this sense, knowledge spillovers or innovative opportunities may refer to tacit knowledge, ideas and approaches of culturally diverse populations, rather than their human capital investment as captured by educational attainment. Also on an individual level, we do not find significant effects of education in moderating the effect of cultural diversity on innovation-orientation. The results contradict the notion that entrepreneurs need a certain level of education to make sense of the ideas and opportunities of cultural diversity as would be expected from perspectives of absorptive capacity.

However, education is an imperfect proxy of the competences required for inter-cultural communication, so more nuanced indicators would be desirable when considering the role of absorptive capacity in future research.

Overall, the positive effect of cultural diversity on innovation-orientation among entrepreneurs seems to apply more generally than would be expected as it applies regardless of the skill-level of the foreign-born population or the entrepreneurs. This result is surprising when considering previous empirical results, such as those presented by Rodríguez-Pose and Hardy (2015), who emphasise that diversity among the high skilled seems to exert the strongest effect on start-up rates in the UK. However, the analysis presented here considers a cross-European dataset and innovation-orientation rather than entrepreneurial start-ups which may explain the difference in results.

Two methodological caveats to the analysis should be considered. First, our analysis relies on self-reported innovation-orientation among early-stage entrepreneurs, which is a subjective measure of innovation. In interpreting the results, it needs to be kept in mind that entrepreneurs may not be impartial judges of their own innovativeness. Identifying innovative entrepreneurs is a difficult task due to data availability as well as general problems of comparability of objective innovation indicators across sectors and types of businesses. Thus, self-reported innovation-orientation as implemented here, i.e. along two items from the GEM-survey, yields a rare and valuable opportunity to investigate questions of innovation among entrepreneurs in general and especially in a sub-national European setting. Second, data limitations also apply to measures of cultural diversity on a regional and cross-European scale. We addressed this issue by exploring different measures of diversity, both on a regional and national level. However, more detailed information on the composition of regional population would be needed in order to disentangle the role of diversity more effectively.

Despite these issues, our results provide strong indications of the innovative value of cultural diversity for entrepreneurship and thus contribute to documenting the economic potential of migration. Our results are in line with previous literature on the role of diversity in fostering entrepreneurship (e.g. Audretsch et al., 2010, 2021, Mickiewicz et al., 2019) and on innovation more generally (e.g. Brixy et al., 2021; Lee, 2015; Niebuhr, 2010) but combine the aspects of entrepreneurial activity with innovation in a novel way. The analysis shows that, across European regions, cultural diversity can be identified as stimulating innovation-orientation among early-stage entrepreneurs. These innovative entrepreneurial ventures imply not only economic opportunities but also processes of discovery and experimentation, which can improve future productivity and quality of life on a societal level. This represents a strong argument for policy to embrace cultural diversity and immigration to benefit from the innovation potential inherent in diverse regional populations. Simultaneously, while the analysis presented here shows robust positive effects, future research needs to overcome data limitations in order to better disentangle the determinants of this innovation potential as well as identify moderating factors.

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APPENDIX

List of Variables

Diversity measures		
share foreign-born	share of foreign-born population	Eurostat
sh. foreign: EU-born	share of population born in another EU country	Eurostat
sh. foreign: non-EU-born	share of population born in a non-EU country	Eurostat
sh. foreign: high educ	share of foreign-born population with high education (ISCED 5,6)	Eurostat
sh. foreign: low educ	share of foreign-born population with low education (ISCED1, 2)	Eurostat
sh. EU-born, high educ	share of EU-born foreign population with high education (ISCED 5,6)	Eurostat
sh. EU-born, low educ	share of EU-born foreign population with low education (ISCED1, 2)	Eurostat
sh. non-EU-born, high educ	share of non-EU-born foreign population with high education (ISCED 5,6)	Eurostat
sh. non-EU-born, low educ	share of non-EU-born foreign population with low education (ISCED1, 2)	Eurostat
fractionalisation	fractionalisation index, see e.g. Niebuhr & Peters (2020)	
Theil-Index	Theil-index of diversity, see e.g. Niebuhr & Peters (2020)	
birthplace diversity (AHR)	Alesina et al. (2016)	
HIEF	Ethnic Fractionalisation index (Drazanova, 2020)	
ELF	Ethno-Linguistic Fractionalisation (Desmet et al. 2012)	
individual characteristics		
female	dummy variable for gender of individual	GEM
age	individual age in years	GEM
education	educational attainments in 5 categories	GEM
work status	employment status in three categories (employed, not working, retired/student)	GEM
income group	income category by tertile	GEM
Regional Characteristics		
ln GDP p.c.	log of GDP per capita (in PPS)	Eurostat
unemployment	unemployment rate	Eurostat
manuf. employment	share of employment in manufacturing	Eurostat
pop. density	population density	Eurostat
share pop aged 18-34	share of population aged 18-34	Eurostat
share pop with tertiary educ	share of population with tertiary education	Eurostat
R&D spending	R&D spending (total) as % of GDP	Eurostat
patents per capita	patents per capita	Eurostat
Entrepreneurial attitudes		
sh. fear of failure	share of respondents who say fear of failure would prevent them from starting a firm	GEM
sh. know entrepreneur	share of respondents who say that they know an entrepreneur	GEM
sh. opportunities	share of respondents who think there will be good opportunities to start a business	GEM
sh. skills	share of respondents who think they have the required skills to start a business	GEM

Summary statistics

	N	Mean	SD	Min	Max
share foreign-born	39627	0.109	0.065	0.003	0.410
sh. foreign: EU-born	39627	0.039	0.035	0.002	0.317
sh. foreign: non-EU-born	39627	0.070	0.046	0.001	0.264
sh. foreign: high educ	39627	0.033	0.030	0.001	0.216
sh. foreign: low educ	39627	0.040	0.026	0.000	0.166
sh. EU-born, high educ	39627	0.280	0.103	0.059	0.558
sh. EU-born, low educ	39627	0.272	0.118	0.054	0.607
sh. non-EU-born, high educ	39627	0.329	0.101	0.105	0.694
sh. non-EU-born, low educ	39627	0.348	0.114	0.114	0.665
fractionalisation	39627	0.192	0.098	0.007	0.566
Theil-Index	39627	0.352	0.147	0.023	0.870
birthplace diversity (AHR)	38715	0.153	0.098	0.010	0.531
HIEF	38671	0.394	0.212	0.058	0.661
ELF	39627	0.169	0.168	0.011	0.663
female	39627	0.378	0.485	0	1
age	39627	39.6	11.4	18	84
education	39627	2.490	1.012	0.000	4.000
work status	39627	1.136	0.425	1.000	3.000
income group	39627	1.757	1.128	0.000	3.000
GDP p.c.	39627	24903.4	9012.9	7700	64400
unemployment	39627	0.120	0.063	0.025	0.282
manuf. employment	39627	0.141	0.057	0.037	0.319
pop. density	39627	341.2	771.9	3.3	6902
share pop aged 18-34	39627	0.230	0.023	0.162	0.297
share pop with tertiary educ	39627	0.291	0.083	0.090	0.495
R&D spending	39627	0.015	0.010	0.002	0.064
patents per capita	39627	78.2	106.7	0.178	710.8
sh. fear of failure	39627	0.392	0.096	0.208	0.590
sh. know entrepreneur	39627	0.304	0.064	0.170	0.445
sh. opportunities	39627	0.221	0.075	0.110	0.501
sh. skills	39627	0.406	0.069	0.248	0.567

Correlation matrix:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
(1) for_birth	1.000																									
(2) for_EU	0.684	1.000																								
(3) for_NEU	0.914	0.329	1.000																							
(4) for_high	0.798	0.605	0.697	1.000																						
(5) for_low	0.878	0.648	0.776	0.540	1.000																					
(6) high_EU	0.265	0.161	0.254	0.585	0.036	1.000																				
(7) high_NEU	0.011	0.183	-0.089	0.494	-0.262	0.765	1.000																			
(8) low_EU	-0.291	-0.136	-0.301	-0.410	0.045	-0.593	-0.405	1.000																		
(9) low_NEU	-0.025	0.013	-0.040	-0.326	0.359	-0.388	-0.683	0.561	1.000																	
(10) Fract_3	0.992	0.682	0.904	0.757	0.881	0.253	-0.012	-0.296	-0.014	1.000																
(11) Theil	0.978	0.705	0.873	0.731	0.887	0.255	-0.015	-0.279	0.021	0.995	1.000															
(12) bpdiv	0.361	0.013	0.460	0.315	0.100	0.178	0.130	-0.418	-0.374	0.379	0.354	1.000														
(13) HIEF	0.161	-0.010	0.213	0.028	0.252	-0.089	-0.091	0.482	0.124	0.183	0.202	0.030	1.000													
(14) ELF6	0.116	-0.006	0.153	0.088	-0.052	-0.049	0.011	-0.233	-0.209	0.105	0.073	0.626	-0.244	1.000												
(15) age	0.016	0.057	-0.011	0.040	0.024	0.092	0.073	-0.027	0.023	0.019	0.029	-0.012	-0.006	-0.050	1.000											
(16) lngdppc	0.383	0.507	0.213	0.366	0.426	0.450	0.122	-0.160	0.381	0.396	0.443	-0.067	-0.045	-0.095	0.120	1.000										
(17) unem	0.111	-0.024	0.157	-0.048	0.162	-0.333	-0.265	0.393	-0.008	0.124	0.113	-0.087	0.641	-0.216	-0.086	-0.442	1.000									
(18) manu	-0.332	-0.206	-0.315	-0.422	-0.214	-0.476	-0.323	0.209	0.123	-0.327	-0.336	-0.188	-0.159	-0.005	-0.043	-0.317	-0.156	1.000								
(19) density	0.653	0.443	0.599	0.670	0.562	0.324	0.136	-0.212	0.010	0.572	0.538	0.063	-0.050	0.100	0.014	0.349	-0.140	-0.321	1.000							
(20) sh_1834	0.318	0.252	0.272	0.387	0.209	-0.005	0.144	0.047	-0.336	0.277	0.231	-0.110	0.179	-0.077	-0.082	-0.257	0.478	-0.146	0.302	1.000						
(21) edu_high	0.296	0.231	0.254	0.469	0.147	0.585	0.433	-0.229	-0.075	0.292	0.302	0.130	0.248	-0.079	0.069	0.599	-0.186	-0.370	0.288	0.038	1.000					
(22) tot_rd	0.128	0.225	0.041	0.123	0.115	0.306	0.090	-0.237	0.228	0.146	0.171	-0.006	-0.271	0.006	0.073	0.620	-0.471	-0.019	0.132	-0.285	0.457	1.000				
(23) pat_pc	0.154	0.259	0.056	0.086	0.188	0.143	-0.063	-0.164	0.298	0.172	0.200	0.082	-0.346	0.117	0.072	0.590	-0.516	0.102	0.086	-0.359	0.279	0.776	1.000			
(24) fearfail	-0.086	-0.136	-0.035	-0.333	0.077	-0.569	-0.554	0.385	0.206	-0.075	-0.081	-0.369	0.355	-0.345	-0.098	-0.360	0.657	0.241	-0.196	0.304	-0.279	-0.328	-0.329	1.000		
(25) knowent	-0.033	-0.117	0.023	-0.189	-0.021	-0.331	-0.435	0.174	0.186	-0.033	-0.058	-0.090	0.081	-0.083	-0.071	-0.063	0.411	0.019	-0.152	0.294	0.006	0.047	0.039	0.531	1.000	
(26) opport	0.167	0.102	0.159	0.178	0.013	0.357	0.095	-0.451	-0.017	0.176	0.176	0.287	-0.396	0.176	0.045	0.465	-0.381	-0.160	0.076	-0.170	0.311	0.539	0.563	-0.315	0.383	1.000
(27) skill	0.067	-0.037	0.107	-0.119	0.189	-0.337	-0.345	0.345	0.107	0.079	0.072	-0.297	0.487	-0.478	-0.061	-0.254	0.632	0.018	-0.101	0.465	-0.163	-0.362	-0.417	0.752	0.513	-0.318