Social trust and new firm formation: a regional perspective

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Abstract This paper aims to contribute to the analysis of informal institutions on entrepreneurship. In particular, we follow a regional perspective to explore the role of social trust as a determinant of new firm formation, enhancing the flow of information and knowledge exchange across spatially embedded relational structures that underpin entrepreneurial processes. Also, we argue this bridging effect of social trust may be subdued in regions with higher levels of economic development characterised by stronger quality of governance and more defined entrepreneurial ecosystems. Combining data from Eurostat and the European Social Survey for over 200 regions across nine EU countries, the paper provides novel empirical evidence that social trust plays a significant role in fostering the formation of new firms. At the same time, the results indicate that the strength of formal institutions and the regional economy exert a critical moderating effect as the importance of social trust on new firm formation progressively increases in regions characterised by decreasing levels of economic development.

Keywords Social capital · Trust · Institutions · Entrepreneurship · Regional economic development

JEL classification L26 · O1 · O52 · R11

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1 Introduction

New firm formation has long been regarded a fundamental element within theories of economic growth and regional development for the contribution of new firms in creating new jobs and promoting change, leading to a dynamic and resilient economy (Baumol 1990; Fritsch 2013). Reflecting the significant variation in the rate of new firm formation across regions, an extensive stream of research has pointed to the importance of the socio-economic context for entrepreneurship, exploring regional effects defined by industry structure and density, employment and physical and human capital available in different areas (Reynolds et al. 1994; Armington and Acs 2002; Fritsch and Falck 2007; Fotopoulos 2013). Further research has investigated the role of the localised knowledge stock and the level and characteristics of knowledge spillovers (Rosenthal and Strange 2003; Acs et al. 2009; Corradini and De Propris 2015).

However, part of the variation in new firm formation rates across regions remains unexplained, leading to a growing research on the role of formal and informal institutions on entrepreneurship (Baumol 1990; Estrin and Mickiewicz 2011; Urbano et al. 2019). Within this strand of research, scholars have provided new insights and evidence on the complex relationship between formal institutions such as quality of governance, business

regulation and strength of entrepreneurial ecosystems on cross-country differences in the rate of new firm formation (Estrin et al. 2013; Stenholm et al. 2013; Audretsch et al. 2019a, b). Similarly, scholars have started exploring the linkages between formal institutions, entrepreneurship and the level of economic activity (Chowdhury et al. 2019). Conversely, relatively less attention has been devoted to regions as loci where interactive learning and recombination of ideas may occur through informal institutions, as notably reflected in concepts such as industrial districts, regional systems of innovation and learning regions (Becattini 1987; Morgan 1997; Cooke et al. 1998).

In particular, drawing on the literature on social capital as a relational structure of communities and places (Putnam 1993; Fukuyama 1995), scholars have long emphasised the importance of trust on the structure of networks and knowledge diffusion within clusters (Saxenian 1996; Anderson and Jack 2002; Molina-Morales et al. 2002; Malecki 2012; Lefebvre et al. 2015). Entrepreneurship research on trust has similarly underlined the spatially bound nature of the institutional environment defining the level and impact of trust, pointing to significant differences across regions and localities (Welter and Smallbone 2006; Welter 2011). Yet, while a few papers have explored the role of social trust for economic growth and regional innovation (Knack and Keefer 1997; Capello and Faggian 2005; Tabellini 2010), insights over the relationship between the role of regional social trust as a conduit for the transmission of knowledge and the connection of ideas and opportunities underlying new firm formation remain underdeveloped. Furthermore, notwithstanding the discussion on the contextual nature of trust (Fukuyama 1995; Welter 2012), there is scant evidence on the potential interplay between effects of social trust and the level of economic development or formal institutions for entrepreneurship.

This paper aims to contribute to the research on entrepreneurship and institutions exploring the relationship between social trust and new firm formation at the regional level. Building on seminar insights from institutional theory (North 1990, 2005; Baumol 1990) and relational economic geography perspectives (Storper 1997; Bathelt and Glückler 2003), our contribution is three-fold. First, following the recent call for more research on the role of institutions in entrepreneurship and subnational perspectives (Belitski et al. 2019; Audretsch et al. 2019a, b), we offer novel insights on informal institutions looking at the specific case of social trust. In particular, we posit that higher levels of social trust across regions may enhance the flow of information and the exchange of tacit knowledge across embedded institutions, firms and people, thereby facilitating knowledge spillovers that are at the base of new firm formation. Second, in line with the insights on the complex relationship that characterises social trust and different levels of economic development (Schneider et al. 2000; Guiso et al. 2004; Ahlerup et al. 2009; Roth 2009) as well as the discussion on potential asymmetries between formal and informal institutions (North 1990; Chowdhury et al. 2019), we put forward the hypothesis of a moderating effect between these elements and regional social trust for new firm formation. Finally, merging data from Eurostat and the European Social Survey for over 200 NUTS3 regions across 9 European countries, the paper offers novel evidence that social trust within regions may enhance the flow of information and tacit knowledge fostering the new firm formation. However, our results also point to a critical moderating effect of the strength of regional economies over this relationship as the positive effect of social trust progressively reduces in regions characterised by increasing levels of economic development. Likewise, the analysis offers initial evidence of the potential interplay between formal and informal institutions, pointing to similar moderating effects exerted by quality of regional governance and stronger entrepreneurial ecosystems.

The rest of the paper is organised as follows. In the next section, we explore previous literature and introduce the hypotheses of the study. The following section introduces data and variables along with the estimation approach. Next, we present and discuss our main findings. The last section concludes the paper with some final remarks and limitations of the study.

2 Literature review and hypotheses

Knowledge formation is not merely a personal, individual process, but is strongly co-defined by the socio-economic and institutional context where it takes place (Granovetter 1985; Howells 2002; Gertler 2003). In this sense, searching and accessing relevant knowledge as well as entrepreneurial opportunities occur within place-specific formal and informal institutions through a process of collective learning (Becattini 1987; Camagni

1991; Boschma 2005; Capello and Faggian 2005). Building on institutional theory (North 1990, 2005; Baumol 1990), entrepreneurship research has long underlined formal institutions reflecting regulatory business environment, property rights enforcement, quality of governance playing a significant role in shaping codified rules and incentives for entrepreneurial decisions (Baumol 1990; Fogel et al. 2006; Estrin et al. 2013). In contrast, informal institutions represent uncodified norms and expected behaviour that define interaction between individuals (North 1990). Scholars have highlighted that informal institutions play a significant role in entrepreneurship, notably suggesting that uncertainty and ambiguity in transactions increase in the presence of corruption (Baumol and Strom 2007; Chowdhury et al. 2019). Following the seminal insights on social relations by Granovetter (1985), Estrin et al. (2013) extend these insights based on uncertainty in economic transactions looking at the case of informal business networks to underline the role of underlying social structures for entrepreneurship.

Building on this, the importance of relational elements in informal institutions for new firm formation can be further explored looking at theoretical perspectives emphasising the role of spatially bounded interactions and connections for knowledge communication and exchange of resources within the regional milieu (Camagni 1991; Storper 1995, 1997; Cooke and Morgan 1998). In particular, a key element defining these localised associative capabilities and intangible relations underlying learning processes is trust (Saxenian 1996; Anderson and Jack 2002; Sabatini et al. 2014; Lefebvre et al. 2015). In the literature, it is possible to identify two main categories of trust: personalised and generalised—or social—trust (Uslaner 2002). In contrast to personalised trust,[1] social trust reflects an abstract sense of trust towards other people in general and takes place across the whole society regardless of context (Uslaner 2002). Essentially occurring among people that do not know each other, social trust results as a consequence of a shared set of norms, expectations and values (Fukuyama 1995).

The traditional argument within economic theory for the importance of social trust is rooted in the idea that the presence of trust lowers transaction costs (Arrow 1974). As economic exchange is inevitably characterised by incomplete contracts and imperfect information, increasing social trust provides an enabling effect across the informal rules underlying economic behaviour, thereby improving efficiency of economic systems and the allocation of resources. For example, access to credit for new business activities may be particularly dependent upon trust (Guiso et al. 2004; Moro et al. 2018). In the same way, it may facilitate coordination in collective undertakings (Hardin 1982; Whiteley 2000). Similar perspectives have been explored in entrepreneurship research,[2] pointing to the role of trust in fostering the flow of information across social networks necessary for recognition and construction of entrepreneurial opportunities as well as in contrasting liabilities of newness (Welter 2012; Kwon et al. 2013). Accordingly, the role of trust may be particularly important in the entrepreneurial stage of new firms, as this is defined by novel informal relations, imperfect information and tacit knowledge (Welter 2012; Pollack et al. 2017). Also, higher monitoring costs with respect to partners or suppliers reduce the time available for entrepreneurial activities (Knack and Keefer 1997; Westlund and Bolton 2003).

The role of trust for entrepreneurship can be further analysed following a macro perspective reflecting the role of the specific spatial context where this relationship and the shared rules of trust are defined (Welter and Smallbone 2006; Welter 2011). In line with this, the role of social trust for new firm formation can be explored drawing from relational economic geography literature (Bathelt and Glückler 2003), which indicates economic coordination is defined by place-specific relationships 'characterized by the exchange of knowledge and high degrees of mutual trust' (Sunley 2008: p.4). Given the importance of face to face communication and interaction, networking and cooperation as core elements in the process of collective learning that defines competitiveness and innovation within regions (Saxenian 1996; Morgan 1997; Storper and Venables 2004), social trust may enable and reinforce the flow of information across embedded institutions, firms and people enhancing the effectiveness of localised connections and repeated

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[1] Personalised trust occurs across a specific group of people that know each other well, such as immediate family but also distributional coalitions (Olson 1982; Hardin 2002). However, while it may create benefits for people belonging to such close networks, this type of trust has mostly been associated with negative effects in terms of distribution of information as well as exposure and openness to new ideas (Banfield 1958; North 2005; Crescenzi et al. 2013).

[2] For a recent review of the role of trust in entrepreneurship, see Mickiewicz and Rebmann (2020).

interactions that underpin new knowledge creation (Molina-Morales et al. 2002; Malecki 2012). In line with these relational perspectives, scholars have explored the role of social trust as a lubricant in the coordination and connectivity processes across regional systems of innovation, providing increasing evidence of a positive effect on innovation (Capello and Faggian 2005; Crescenzi et al. 2013).

Crucially, within this sustained flow of knowledge exchange and information sharing, there are also entrepreneurial opportunities (Delhey et al. 2011; Kwon et al. 2013). The link between these mechanisms and new firm formation can be formalised looking at the knowledge spillover theory of entrepreneurship (Acs et al. 2009; Audretsch et al. 2010), which posits knowledge left unexploited by incumbent firms may be valued and recombined with other ideas by embedded agents with a different evaluation of entrepreneurial opportunities leading to new firm formation. Within this framework, scholars have focused on the role of density to explore the diffusion of knowledge spillovers in the localised information ecology essential for this process of knowledge recombination (Audretsch and Feldman 1996; Acs et al. 2009). Thus, regions can be seen as nodes of interaction functioning as enabling platforms in the recombination of ideas, with trust playing an important role as lubricant for knowledge exchange within spatially embedded social structures (Morgan 1997; Welter 2012).

Social trust may not only increase the amount of information that is shared or exchanged within established localised connections (Tödtling and Kaufmann 2001; Molina-Morales et al. 2002) but it may also allow information to flow across strangers and, more generally, people from varied and socially heterogeneous groups (Anderson and Jack 2002). The absorption of knowledge may well be intentional, but it may also occur through unanticipated learning processes indirectly defined across informal and accidental interactions (Bathelt et al. 2004; Storper and Venables 2004; Boschma 2005). In this way, ideas are passed through different perspectives of a diverse set of economic agents encompassing a wider range of resources, capabilities and interests. These aspects of social trust may equally be important for new firm formation, as the recombination of competencies across diverse socioeconomic agents and the resulting heterogeneity in the evaluation of new ideas exert an important effect in the recognition of entrepreneurial opportunities and new

firm formation. (Lee et al. 2004; Audretsch et al. 2010). Similarly, this 'bridging' effect of trust may reduce ethnic fractionalisation (Churchill 2017) and support the positive advantages identified for places characterised by cultural diversity (Fritsch et al. 2014; Audretsch et al. 2019a, b). In line with these arguments, we posit the following hypothesis:

H1. *Social trust is positively associated with the regional rate of new firm formation.*

So far, the discussion has looked at the role of social trust as if this were independent of the regional socioeconomic structure. In contrast, entrepreneurship research has underlined the contextual nature of social trust (Fukuyama 1995; Welter 2012), suggesting many of its positive effects could be seen as substitutes for an efficient and advanced socio-economic environment. Regions with higher levels of economic development have more efficient labour markets, larger market size and a stronger provision of financial resources and venture capital (Wennekers et al. 2010; Chowdhury et al. 2019). These elements provide stronger 'transactional trust' (Fogel et al. 2006) which could partially offset lower levels of social trust. More broadly, economic development has long been discussed as mutually interdependent with the strength of formal institutions (North 1990; Ahlerup et al. 2009). In this sense, economic development may impact the role of social trust reflecting the asymmetries between formal and informal institutions (North 1990; Chowdhury et al. 2019). Similarly, Welter (2012) discusses the differential impact of trust in high- and low-trust environments, while Audretsch et al. (2018) provide initial evidence that the effect of trust on innovation may be displaced by formal institutions in developed economies.

In particular, it is possible to disentangle two separate elements that tend to be positively associated with economic development but define specific effects on trust: quality of governance and the strength of entrepreneurial ecosystems. In entrepreneurship research, growing evidence is pointing to the importance of the quality of governance and regulatory business environment in defining entrepreneurship rates (Estrin et al. 2013; Audretsch et al. 2019a, b). Scholars have also suggested that the strength of formal institutions such as quality of governance may moderate the effects of social trust (Rodríguez-Pose and Storper 2006; Rodríguez-Pose 2013). Welter (2012) indicates trust may substitute for low levels of institutional control and deficiencies in legal sanctions. Mickiewicz and Rebmann (2020)

discuss the argument that dysfunctional government may increase distrust in business, while Amoako et al. (2020) find trust supports trade credit relationships for entrepreneurs in developing economies with weak formal institutions. In line with the findings by Guiso et al. (2004), social trust becomes more important if firms face uncertainty as to whether contracts and agreements will be enforced or how long a possible litigation will take. In other words, the importance of social trust in lowering transaction costs may reduce when property rights are better defined and law enforcement becomes more efficient (Ahlerup et al. 2009). The same argument goes for the role of trust in solving the principal agent problem, as contracts with partners, suppliers or employees for new firms are more easily defined and protected, and entrepreneurs have to worry less about possible malfeasance. This is likely to be especially relevant for the setting up of new companies, given the limited information and risky environment within which they need to grow (Tödtling and Kaufmann 2001).

The second element reflects the importance of entrepreneurial ecosystems as a dynamic web of different economic agents within place-specific institutional and informational environments in supporting exchange of ideas underpinning new firm formation (Szerb et al. 2013; Audretsch and Belitski 2017). Echoing insights on the role of entrepreneurship capital (Mickiewicz et al. 2017) and the interplay between formal institutions and local social structures (Estrin et al. 2013), the presence of such institutions defines a structural support for information exchange that may play a moderating effect with respect to social trust. When the web of informal norms and relations is relatively underdeveloped, with routines and conventions being sparse and not fully mature, people may need higher levels of trust in order to initiate new activities as well as generate opportunities for knowledge and information exchanges. As regions evolve, traded and untraded interdependencies that shape localised connections can be seen as increasingly defined, offering a more effective 'supply architecture' for learning and innovating (Storper 1995). This process leads to a more inclusive network of stable interactions where social trust progressively loses its pivotal role in 'opening up' closed communities and reducing over-reliance on the restricted social circles (Laursen et al. 2012; Crescenzi et al. 2013), or even breaking down 'amoral familism' (Banfield 1958) that may hamper connections and communication across the system. Thus, an increasingly established ecosystem of

inter-organisational relations may exert a substitution effect for social trust, defining a more open and efficient way to coordinate actions as well as promote exposure to novel ideas and unexpected learning opportunities (Grabher 2002). Similarly, Mickiewicz et al. (2017) suggest relational social capital may be particularly important in the early stages of entrepreneurship, where opportunity recognition is more complex. In line with these arguments, we hypothesise the following:

H2. Higher levels of regional economic development negatively moderate the relationship between social trust and the regional rate of new firm formation.

H3. Higher levels in the quality of regional governance and entrepreneurial ecosystems negatively moderate the relationship between social trust and the regional rate of new firm formation.

3 Data and methodology

The data for this study is obtained merging information from the Eurostat regional database and two successive rounds for the years 2008 and 2010 (waves 4 and 5) of the European Social Survey (ESS), which offers multi-level data on attitudes, values and cultural orientation across European countries. The empirical investigation is conducted using a pooled cross-section for over 200 NUTS3 regions across 9 EU countries offering a representative mix of large and small countries from both the West and East of Europe. These are Bulgaria, Denmark, Spain,[3] Finland, France, the Netherlands, Romania, Slovenia and Slovakia.

The limited coverage of the dataset is dictated by constrains in the information available on both firm formation at the regional level from Eurostat and trust from ESS data. In particular, while information on social trust is available for all countries, the number of countries for which statistical inference is possible at the regional level is limited. The breakdown for the multi-level information in the dataset where information from the ESS is representative at the regional level and the specific spatial level available for the analysis are reported in the Appendix (Table 5).

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[3] Six Spanish regions are available for statistical inference in the ESS: Andalucía (ES61), Madrid (ES30), Cataluña (ES51), Valencia (ES52), Castilla y León (ES41) and Galicia (ES11).

3.1 Dependent variable

In this study, new firm formation is measured using data on the number of new enterprises within a NUTS3 region starting a new activity, using harmonised data drawn from business registers of the selected EU countries. To account for the variance in the dimension of NUTS3 regions, the number of new firms is standardised with respect to the total population to reflect start-up intensity (Lee et al. 2004; Corradini and De Propris 2015; Rodríguez-Pose and Hardy 2015). Accordingly, the dependent variable (ENTRY) measures enterprise birth per 1000 inhabitants and enters the model after being log-transformed. For robustness, we also report the results measuring new firm formation in line with the ecological approach suggested by Armington and Acs (2002),[4] standardising the number of new firms relative to the total number of firms in the region.[5]

3.2 Independent variable

The key explanatory variable for this study, representing regional social trust and labelled TRUST, is taken from the European Social Survey (ESS). Clearly, trust is a multifaceted concept and we can only rely on proxy measures to define it (Malecki 2012). Yet, while measures of personalised trust are difficult to obtain, as this is mostly contextual and based on past experience, the question on trust in the ESS is argued to effectively capture the level of generalised trust in the society as it measures confidence in strangers reflecting collective experience and shared set of values while making no mention of context (Uslaner 2002; Delhey et al. 2011). In this sense, it echoes the perception that people have of the reliability of those living around them and their expectations. Our measure of social trust is based on the following question from the ESS: 'Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?' Individual responses are based on a 10-point scale ranging from the lowest category being 'You can't be too careful' to the highest 'Most people can be trusted'. To define TRUST, we make use of the unconditional average response for each region. This measure is commonly used in previous studies looking at social trust at the country level (Knack and Keefer 1997; Roth 2009; Tabellini 2010), and it is one of the indicators used by the OECD to measure social cohesion (Scrivens and Smith 2013).

The second key variable in this study is constituted by the level of economic development of regions. Following extensive economic literature, we make use of data on regional GDP per capita, in purchase power parity, to proxy the level of regional economic development (Furman et al. 2002; Chowdhury et al. 2019). Related to hypothesis 3, we try to disentangle the role of formal institutions from economic development looking at quality of regional governance and strength of entrepreneurial ecosystems. For the former, we use the Quality of Government (QOG) index from the QoG EU Regional dataset (Charron et al. 2014, 2016), based on 16 different measures of impartiality, corruption and quality in public services, which has been recently employed to explore the link between government institutions and regional innovative and economic performance (Rodríguez-Pose and Di Cataldo 2014; Rodríguez-Pose and Garcilazo 2015). The latter is based on the Regional Entrepreneurship and Development Index (REDI), developed by Szerb et al. (2013). The REDI is a composite measure of different dimensions related to entrepreneurial ecosystems at the regional level, based on 40 indicators reflecting entrepreneurial attitudes, abilities and aspirations (For more information, see Szerb et al. 2013).

To control for potential confounding factors, we include in the model a set of variables that reflect established determinants of regional entrepreneurship (Armington and Acs 2002; Fotopoulos 2013). First, we add a control variable for human capital in the region. We measure HUMAN CAPITAL as the share of the working population (people aged 25–64) in the region with tertiary education, which is equivalent to at least degree-level qualifications (Qian and Acs 2013). Similarly, to capture innovation and new knowledge creation, we add the variable PATINT defined as the number of patents per 1000 inhabitants. Additionally, we control for the level of UNEMPLOYMENT in the region (Lee et al. 2004; Audretsch et al. 2015). Another traditional determinant of firm birth is POPULATION GROWTH, measured as the annual rate of change in total population for each region over the previous year, which accounts for demand effects in the formation of new companies as a result of a growing population

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[4] See also Audretsch et al. (2019a, 2019b).
[5] As Armington and Acs (2002), this approach results in higher new firm formation in regions where establishment size is relatively high.

(Armington and Acs 2002; Rodríguez-Pose and Hardy 2015). Following Armington and Acs (2002), we add two final control variables to reflect the structure and density of interaction within the regional economy. ESTSIZE is a proxy for the industry structure, defined as total employment over the number of establishments in the region. The final control is a measure of industry density, which may function as a proxy for spillovers and more intense interaction in pooled labour markets capturing both population density and the number of establishments in a region (Armington and Acs 2002). This variable, labelled INDENSITY, is calculated as the number of establishments divided by the region's total population.

3.3 Model specification

In the analysis, we first estimate our model using multilevel regression analysis. Considering the hierarchical structure of the dataset, multilevel modelling presents several advantages over traditional multivariate regression analysis (Snijders and Bosker 1999; Rabe-Hesketh and Skrondal 2012). Multilevel regression allows including variables defined at each level of the data structure and correcting for non-independence across observations providing unbiased estimates of the parameters of interest. Furthermore, the random-effects specification provides efficient estimates even in the presence of small cluster sizes for some regions, which could affect estimates if these were treated as fixed-effects (Rabe-Hesketh and Skrondal 2012). Finally, this type of model can also be used to study whether the relationship between variables at one level may depend on variables at a different level.

As we only have 9 countries in the dataset, resulting in an insufficient number of clusters to be included in the model as random effects (Richter 2006), we follow Aslam and Corrado (2012) and include country-level dummy variables in the fixed rather than random effects part of the model.[6] The inclusion of fixed-effects at the country levels allows to control for the effect of formal institutions defined in national law. To reflect the pooled cross-section nature of the data, we also include a time dummy and a random slope for its interaction at NUTS2 level to allow the slope of each country to vary across time.

Table 1 Descriptive statistics

	Mean	Median	SD	Max	Min
Entry	0.70	0.77	0.59	2.90	− 1.24
GDP	21,589	21,600	10,250	80,700	5500
QoG	0.37	0.65	0.97	1.60	− 2.48
REDI	48.48	51.10	15.13	82.20	18.40
Trust	4.78	4.49	1.09	6.92	2.85
Educ	25.89	26.60	7.98	46.80	8.60
Patint	0.21	0.04	0.50	4.11	0
Unemp	8.33	7.90	4.80	27.80	2.10
Popgrow	0.138	0.186	0.877	4.146	− 2.425
Estsize	0.068	0.047	0.064	0.523	0.004
Indensity	53.48	53.22	19.38	156.02	9.53

For robustness, we also estimate our model with two different regression methods. The first is OLS regression with cluster robust standard errors to take into account the pooled cross-section nature of the dataset. Second, we run fixed-effects regression with clustered errors to control for any further unobserved heterogeneity across regions.[7]

4 Results and discussion

We start our analysis from a brief discussion of key descriptive statistics in our dataset, reported in Table 1. Looking at standard deviations and maximum and minimum values with respect to mean values, we find evidence of significant heterogeneity across different regions in terms of both socio and economic elements, with well-known variation for elements such as GDP, education and population growth, but also industry structure. Our data show this to be true for social trust as well, with a standard deviation of 1 over a range of around 4. Looking at the correlation matrix, reported in Table 2, we find an expected positive correlation between social trust, the level of GDP and human capital.[8] Similarly, there is a positive correlation between

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[6] Results are robust when countries are added as an additional random-effects level in the model.

[7] Results are also robust to generalised estimating equation (GEE) regression with an auto-regressive correlation structure and robust standard errors to control for potential serial correlation in the data.

[8] Notwithstanding the moderate correlation present across some of the variables, the analysis of errors and narrow confidence intervals and stability across models for the regression coefficients indicate that variance inflation is not a significant concern in the data (Wooldridge 2002; O'Brien 2007).

Table 2 Correlation matrix

	1	2	3	4	5	6	7	8	9	10
Entry	1									
GDP	0.132	1								
QoG	-0.656	0.192	1							
REDI	-0.195	0.396	0.565	1						
Trust	-0.318	0.577	0.532	0.045	1					
Educ	-0.129	0.681	0.231	0.472	0.604	1				
Patint	-0.016	0.383	0.372	0.297	0.402	0.332	1			
Unemp	0.100	-0.195	-0.739	-0.618	-0.202	-0.084	-0.338	1		
Popgrow	0.336	0.516	0.101	0.262	0.332	0.379	0.106	0.117	1	
Estsize	-0.171	-0.381	-0.018	0.181	-0.181	-0.251	-0.020	-0.137	-0.303	1
Indensity	0.393	0.609	-0.278	-0.071	0.316	0.577	0.139	0.238	0.554	-0.471

QoG and REDI values based on 2010 data

regional economic development and our measures of quality of governance and entrepreneurial ecosystems.

Results from multilevel models (MLM), using maximum-likelihood and robust standard errors, are presented in Table 3. In this table, column 1 presents the estimates for the full model with interaction between TRUST and GDP, based on new firm formation rate defined by a number of new firms' over population across all industries as dependent variable. In line with previous evidence on differences in structure and dynamics across manufacturing and service industries (Fritsch and Falck 2007), we also estimate our model on the number of new firms across manufacturing industries only (NACE Classification Code B-F) and service industries only (NACE Classification Code M-S). Results are reported respectively in columns 2 and 3. Columns 3 to 6 report similar models, but the dependent variable is based on the ecological approach reflecting the number of new firms relative to the total number of existing businesses.

Looking at the estimates in column 1, we observe a statistically significant positive effect of TRUST on new firm formation ceteris paribus, in line with hypothesis 1. As expected, we also observe a positive effect for regional GDP, suggesting a stronger level of economic development to be conducive to entrepreneurship. Both variables show positive coefficients which are statistically significant at the .01 level. These findings point to a significant role of social trust on new firm formation,

supporting the hypothesis that trust may enhance the flow of information through both intended and unexpected localised connections and interactions underpinning regional combinative opportunities that are at the base of new firm formation.

However, this effect should not be considered as linear. In particular, the interaction term between trust and GDP is significant at the .01 level, and presents a negative sign as suggested by hypothesis 2. These results indicate that the level of regional economic development exerts a critical moderating effect on the importance of social trust on new firm formation, as its impact progressively increases in regions characterised by lower levels of economic development. In line with findings by Audretsch et al. (2018) on innovation activities, while our analysis indicates that TRUST exerts a positive effect on firm birth, such effect is progressively more important in developing regions. These results are robust in the models where we analyse firm birth across either only manufacturing industries (column 2) or service industries (column 3), or when measuring new firm formation following the ecological approach (columns 4–6).

We can explore the moderating role of regional economic development on the relationship between social trust and firm formation in Fig. 1, which presents both adjusted predictions on the left (a), as well as average marginal effects on the right (b). Adjusted predictions show the positive effect of a one point increase in TRUST for different

Table 3 Multilevel maximum-likelihood regression estimates

	MLM					
	(1)	(2)	(3)	(4)	(5)	(6)
Fixed-effects						
ln(GDP)	0.532***	0.837***	1.135***	1.850***	−0.087	1.283***
	(0.137)	(0.264)	(0.171)	(0.613)	(0.291)	(0.235)
Trust	0.952***	2.303***	1.719***	3.279***	0.460	1.811***
	(0.256)	(0.520)	(0.349)	(1.262)	(0.527)	(0.481)
ln(GDP)*trust	−0.094***	−0.231***	−0.169***	−0.335***	−0.043	−0.181***
	(0.026)	(0.051)	(0.035)	(0.120)	(0.053)	(0.049)
Educ	0.008***	0.007	0.013***	0.056***	0.007	0.038***
	(0.003)	(0.006)	(0.002)	(0.015)	(0.006)	(0.007)
Patint	0.002	0.093***	0.017	−0.033	0.021	0.001
	(0.016)	(0.021)	(0.017)	(0.082)	(0.026)	(0.024)
Unemp	0.012**	−0.001	0.020***	0.031	−0.007	0.024
	(0.005)	(0.006)	(0.006)	(0.041)	(0.005)	(0.016)
Popgrow	0.080***	0.133***	0.081***	0.373***	0.138***	0.044*
	(0.020)	(0.025)	(0.024)	(0.121)	(0.037)	(0.025)
Estsize	−0.729***	−0.682**	−1.557***	−0.300	0.218	−1.312***
	(0.184)	(0.340)	(0.283)	(0.920)	(0.354)	(0.213)
Indensity	0.013***	0.010***	0.013***	−0.009*	−0.004***	−0.002
	(0.002)	(0.002)	(0.002)	(0.005)	(0.001)	(0.002)
const	−5.144***	−9.251***	−12.61***	−9.275	2.234	−10.48***
	(1.384)	(2.628)	(1.748)	(6.453)	(2.878)	(2.228)
Random effects						
Time (var)	0.064***	0.084***	0.035***	2.900**	0.681	0.080***
	(0.020)	(0.024)	(0.009)	(1.478)	(0.305)	(0.025)
NUTS2 (var)	0.003*	0.014***	0.004***	1.433	0.006***	0.218***
	(0.010)	(0.019)	(0.005)	(1.834)	(0.005)	(0.123)
NUTS3 (var)	0.007***	0.018***	0.010***	0.177***	0.035***	0.022***
	(0.002)	(0.005)	(0.003)	(0.094)	(0.018)	(0.007)
N	417	417	417	417	417	417
AIC	−420.78	−.928	−135.46	962.07	255.93	106.92
Wald chi	3527.5***	3043.8***	4523.9***	7849.3***	5100.1***	2208.1***
Log pseudolikelihood	234.39	24.46	91.73	−457.03	−103.96	−29.46

Robust SE in parentheses

*p < 0.10

**p < 0.05

***p < 0.01

levels of GDP. While the effect is positive, it is decreasing as we move across the GDP distribution. After the threshold of the 75th percentile (lnGDP = 10), an increase in social trust has no longer a positive impact. Marginal effects show a similar picture, with a decreasing effect of TRUST on firm formation for increasingly higher levels of regional GDP. In particular, while we find a positive effect until the 75th percentile, the results are not statistically significant for values of ln(GDP) just under the mean of 9.8 in the sample.
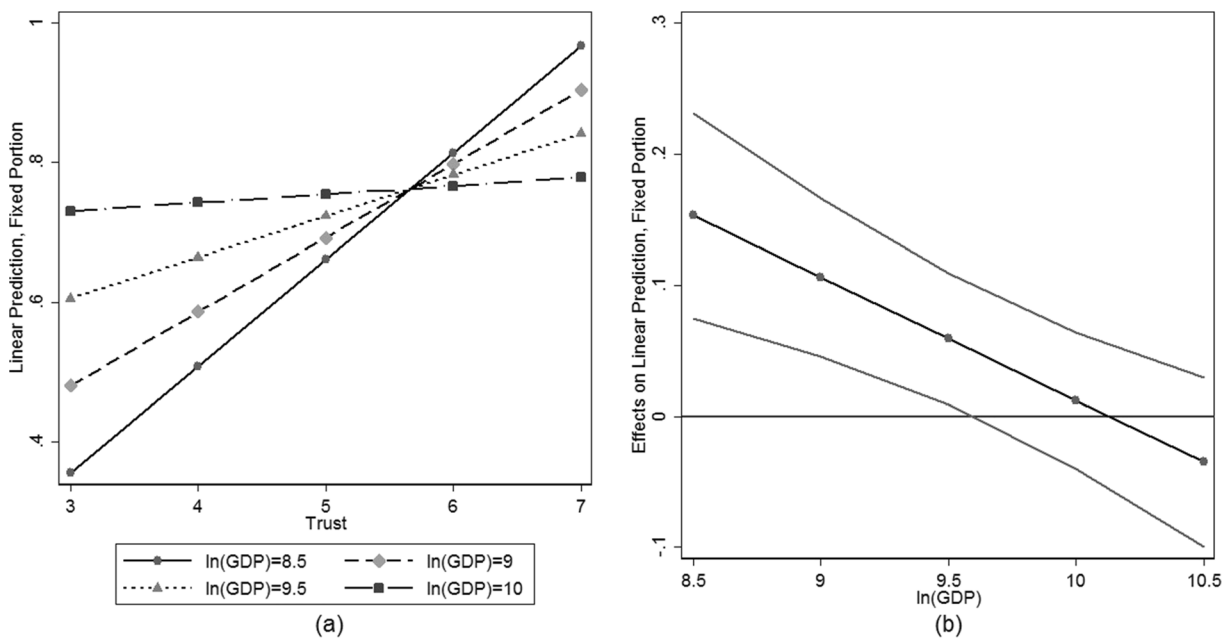
Fig. 1 Predicted probabilities (**a**) and marginal effects (**b**) for TRUST across GDP levels

To test hypothesis 3, we try to disentangle the effect of formal institutions reflecting quality of regional governance and the strength of entrepreneurial ecosystems from regional economic development in Table 4. First, we replicate our model adding the variable QOG in columns 1 and 3, which are based respectively on new firm formation standardised for total population and population of firms. In column 1, we find the expected signs for the coefficients of interest. However, only QOG is statistically significant. This may be due to reduced variance in the sample based only on 2010 as well as the correlation between QOG, GDP and trust.

However, when we look at the results based on the ecological approach for new firm formation (column 3), results are statistically significant and in line with previous evidence. Here, we find a positive effect of both social trust and quality of governance, with the latter exerting a moderating effect on trust in line with hypothesis 3. We find similar results when we introduce the REDI to capture entrepreneurial ecosystems. In this case, results are consistent and statistically significant for both measures of entrepreneurship in columns 2 and 4. Average marginal effects for the interaction effects of QOG and REDI on trust are reported in the Appendix (Fig. 2). Controlling for regional economic development, these findings confirm previous evidence of a positive effect of formal institutions for entrepreneurship as well as evidence in favour of hypothesis 3

pointing to the presence of a negative moderating effect the quality of regional governance or strength of entrepreneurial ecosystems may exert on the impact of social trust. We note that the inclusion of QOG index or REDI also reduces the sample size for the analysis, as data for this variable are only available for 2010. In this sense, significant results across this subsample provide further robustness for our findings. This is also the case for the fixed-effects model presented in columns 5 and 6 of Table 4, where the sample is constituted by countries for which data are available in both 2008 and 2010. Here, some of the control variables are no longer significant, which may be due to the fixed-effects specification relying solely on within variation. Yet, in line with the main findings reported in Table 3, we still obtain evidence of a positive effect of TRUST, negatively moderated by increasing levels of regional economic development.

Control covariates consistently present the expected signs, reflecting stability of the models. In line with the literature on regional firm entry, higher levels of human capital and population growth are positively associated with new firm formation. Partial correlation between UNEMP and firm entry is also positive in our model. Similarly to evidence by Fritsch and Falck (2007), this effect is mostly driven by firm formation in service sectors, while for manufacturing the effect is not significant. In line with results from previous studies, we find

Table 4 OLS and FE regression estimates

	OLS				FE	
	(1)	(2)	(3)	(4)	(5)	(6)
ln(GDP)	0.012	−0.013	0.274	0.436**	0.187	1.080
	(0.045)	(0.048)	(0.200)	(0.221)	(0.276)	(2.325)
QoG	0.156**		0.619*			
	(0.077)		(0.340)			
REDI		0.014*		0.093***		
		(0.007)		(0.034)		
Trust	0.034	0.180**	0.383***	1.387***	0.788*	5.844**
	(0.029)	(0.084)	(0.129)	(0.388)	(0.399)	(2.694)
ln(GDP)*trust					−0.084**	−0.597**
					(0.042)	(0.271)
QoG*trust	−0.029		−0.146*			
	(0.019)		(0.083)			
REDI*trust		−0.002		−0.018**		
		(0.002)		(0.007)		
Educ	0.003	0.001	0.015	0.001	0.032	−0.092
	(0.002)	(0.003)	(0.010)	(0.014)	(0.025)	(0.161)
Patint	−0.032	−0.000	−0.155	−0.035	0.243***	1.121***
	(0.026)	(0.026)	(0.116)	(0.121)	(0.077)	(0.389)
Unemp	0.009**	0.007*	0.030*	0.015	0.026**	−0.099
	(0.004)	(0.004)	(0.017)	(0.018)	(0.012)	(0.080)
Popgrow	0.123***	0.072***	0.223**	0.056	0.045	0.068
	(0.021)	(0.023)	(0.092)	(0.108)	(0.031)	(0.196)
Estsize	−0.079	−0.391	−0.054	−0.403	−2.523	−19.795
	(0.265)	(0.246)	(1.169)	(1.131)	(3.300)	(22.877)
Indensity	0.015***	0.014***	0.002	0.002	−0.012	−0.233***
	(0.001)	(0.001)	(0.003)	(0.003)	(0.009)	(0.070)
const	−0.052	−0.526	1.797	−5.037*	−1.129	11.066
	(0.453)	(0.570)	(2.001)	(2.625)	(2.609)	(22.361)
Country dummies	Yes	Yes	Yes	Yes	No	No
Regional dummies	No	No	No	No	Yes	Yes
2010 Time dummy	No	No	No	No	Yes	Yes
N	199	202	199	202	270	270
F test	189.9***	259.5***	47.9***	64.2***	85.0***	62.0***

Robust SE in parentheses

*$p < 0.10$

**$p < 0.05$

***$p < 0.01$

robust results for the variables proxying industrial structure. ESTSIZE presents a negative coefficient, reflecting the more entrepreneurial nature of regions characterised by smaller firms. Conversely, INDENSITY has a positive and significant effect which confirms established evidence on the importance of agglomeration economies in enabling knowledge exchange that may evolve in new business opportunities.

5 Conclusions

This paper contributes to the literature on institutions and entrepreneurship complementing previous insights on the role of formal and informal institutions with a novel perspective on the role of regional social trust on new firm formation. Combining previous insights on informal social structures in institutional theory (Baumol 1990; Estrin et al. 2013) and relational perspectives in economic geography (Bathelt and Glückler 2003), we suggest that social trust may facilitate the flow of information and knowledge exchange across spatially embedded institutions, firms and people thereby fostering entrepreneurial processes. This relationship should not be considered homogenous across regions. Reflecting the complex relationship between formal and informal institutions, we posit the role of social trust in enhancing knowledge spillovers for entrepreneurial opportunities may reduce in regions with higher levels of economic development, as its effect becomes increasingly integrated within an advanced and established system of interactions and interdependencies offering a regional relational structure that already supports an effective exchange of information. Using data from Eurostat and the European Social Survey for over 200 regions across 9 EU countries, the paper offers initial evidence of a positive effect of regional social trust for new firm formation. Regional economic development and formal institutions are also found to be important determinants of entrepreneurship. At the same time, we find that these exert important moderating effects as the impact of social trust diminishes in regions with higher levels of economic development, stronger quality of governance and more defined entrepreneurial ecosystems.

For entrepreneurship research, the results complement previous studies on the role of informal institutions in defining the level of uncertainty in economic action and market transactions (Estrin et al. 2013; Chowdhury et al. 2019) emphasising the relational dimension of social trust across underlying social structures. Consistent with established synergies between formal and informal institutions, the relational effect of trust is found to be particularly important in places with lower levels of economic development, extending previous evidence on innovative activities (Audretsch et al. 2018). We further disentangle the effects of formal institutions on trust, showing that its effect is moderated by stronger quality of governance and entrepreneurial ecosystems. From a regional perspective, the findings provide further evidence for the argument that one-size-fits-all approaches for regional development may be ineffective (Rodríguez-Pose 2013), highlighting once again the complex relationship between formal and informal institutions for regional economic development (Rodríguez-Pose and Storper 2006). In particular, results from the moderation analysis support previous insights on the importance of informal institutions as a foundational element for regions characterised by lower levels of economic development.

While the paper provides initial evidence on the relationship between social trust and new firm formation, the results should be considered taking into account the limitations of the study. The limited longitudinal dimension of the dataset does not allow us to control for time variant unobserved heterogeneity and provide conclusive evidence on causal effects in the mechanisms explored. Further studies should explore potential dynamics and feedback effects between trust and other types of institutions; similarly, we need a better understanding of the linkages between generalised and personal trust and the role of entrepreneurs' behaviour in defining localised social norms (Welter 2012; Mickiewicz and Rebmann 2020). Also, our dataset provides limited information on different types of new firms. We have tried to explore differences across service and manufacturing industries, but the effect of social trust may be further explored looking at a more disaggregated level, and more interestingly considering the case of new innovative ventures. Considering the aggregate perspective adopted in the research design of the paper, additional research is required to fully explore the diverse role of social trust in reducing uncertainty in transactions as opposed to its role as lubricant in processes of knowledge exchange. The importance of these mechanisms may vary when considering different formal institutional elements. Finally, while we explicitly accounted for different levels of regional economic development in our analysis, the role of social trust should be explored looking at the heterogeneous dynamics it may exert across the society as against specific communities, including places characterised by higher migration or cultural diversity. We suggest these elements define important and interesting venues for further research.

Appendix

Table 5 Multilevel data by country and ESS waves

Country	Observations	NUTS2 regions	Trust NUTS level	ESS Waves
Bulgaria, BG	56	6	NUTS3	2008–2010
Denmark, DK	11	5	NUTS2	2008
Spain, ES	58	6	NUTS2	2008–2010
Finland, FI	36	4	NUTS3	2008–2010
France, FR	94	21	NUTS2	2010
Netherlands, NL	80	12	NUTS3	2008–2010
Romania, RO	42	8	NUTS2	2008
Slovenia, SI	24	2	NUTS3	2008–2010
Slovakia, SK	16	4	NUTS3	2008–2010
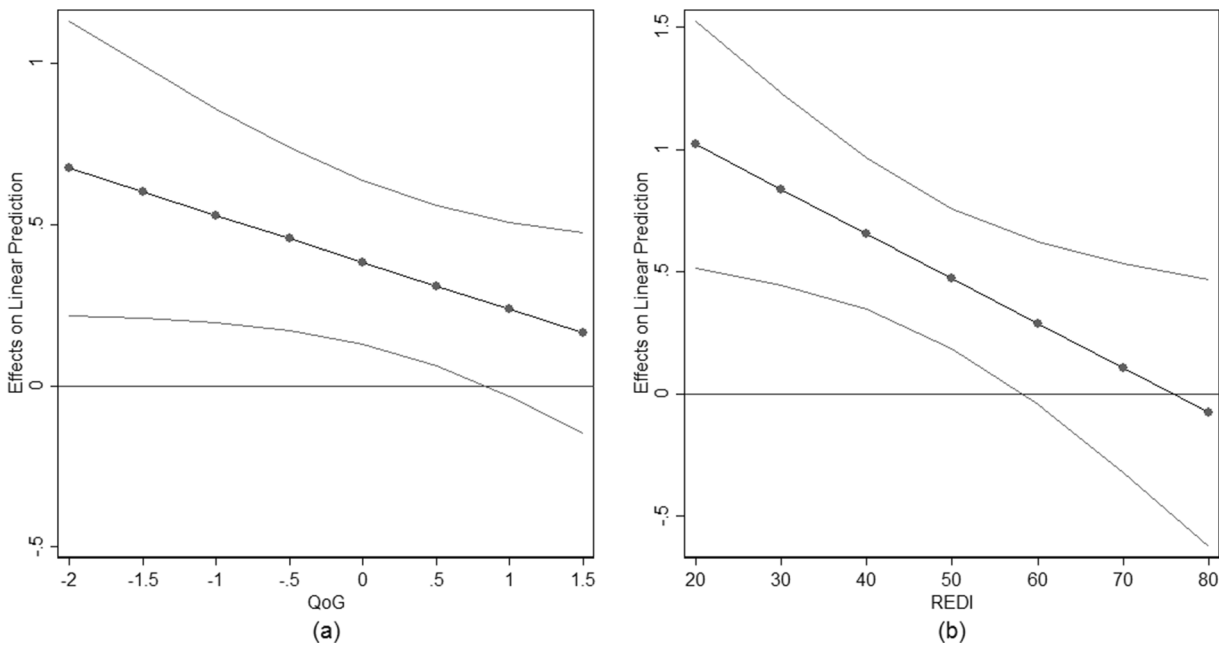
Fig. 2 Marginal effects for TRUST across QoG (**a**) and REDI (**b**) levels

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