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Does Trust Matter for Entrepreneurship: Evidence from a Cross-Section of Countries

Oasis Kodila-Tedika ^{1,*} and Julius Agbor ²

¹ Department of Economics, University of Kinshasa, Kinshasa, Congo

² Department of Economics, Stellenbosch University, Cape Town 7602, South Africa; jagbor1970@gmail.com

* Correspondence: oasiskodila@yahoo.fr; Tel.: +243-891-128-285

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Abstract: Differences in trust levels between countries explain the observed discrepancies in entrepreneurial spirit amongst them. We test this hypothesis with a cross-section of 60 countries in 2010. Our findings suggest that about half of the variation in entrepreneurial spirit across countries in the world is driven by trust considerations. This result is robust to regional clustering, outliers and alternative conditioning variables. The findings of the study indicate that while formal incentives to nurture entrepreneurship must be maintained, policy makers should also seek to pay attention to the role of trust cultivated through informal networks.

Keywords: trust; institution; entrepreneurship

JEL Classification: O17; O50; M29

1. Introduction

Trust has recently received increasing attention in the economic development literature. Scholars have particularly focused on two broad dimensions of trust, namely, its *causes* (see notably, Alesina and La Ferrara, 2002 [1]; Bjørnskov, 2006 [2]; and Smith, 2008 [3]) and its *impact*. In this regard, the impact of trust on economic variables according to Knack and Keefer, (1997) [4], Whiteley, (2000) [5], Zak and Knack (2001) [6], Beugelsdijk *et al.* (2004) [7], Berggren *et al.*, (2008) [8], Kodila-Tedika and Asongu (2013) [9] is a key determinant in explaining cross-country differences in economic growth. Accordingly, Bjørnskov and Méon (2010) [10] find the impact of trust in total factor productivity. Several other authors have been interested in the impact of trust on: institutional development and quality (Helliwell and Putnam, 1995 [11]; La Porta *et al.*, 1997 [12]; Rice and Sumberg, 1997 [13]; Knack, 2002 [14]; Bjørnskov *et al.*, 2010 [15]; Bjørnskov, 2010 [16], 2012 [17]); welfare state design (Bergh and Bjørnskov, 2009 [18]); schooling (Bjørnskov, 2009 [19], 2012 [17]); on innovation (Akçomak, and ter Weel, 2009 [20]); corruption (Bjørnskov, 2010 [16]); trade (Greif 1989 [21]; Woolcock 1998 [22]; den Butter and Mosch 2003 [23]); political and civic involvement (Knack and Keefer 1997 [4], La Porta *et al.*, 1997 [12]); crime prevention (Wilson, 1987 [24]); health (Rose, 2000 [25]); and subjective life satisfaction (Bjørnskov, 2003 [26]; Helliwell, 2003 [27]).

The present study follows the latter broad approach to the subject of trust by investigating its impact on entrepreneurship. Despite the existence of numerous theoretical foundations linking trust to entrepreneurial spirit, to the best of our knowledge, no prior empirical study in the literature to date has explicitly tested this relationship. According to Harper (2003) [28], trust is crucial to cultivating entrepreneurship. Because business transactions rely on trust, where there is trust, businesses generally thrive. Additionally, most prior studies linking trust to entrepreneurship have utilized a microeconomic or management framework. This paper analyzes this linkage from a macroeconomic perspective.

Indeed, nothing genuinely to confirm the results found so far can explain the differences at the country level for entrepreneurship. The specific and sectorial contexts of each country in addition to micro level data effectively validate this argument.

From a macroeconomic view point, the absence of trust need not necessarily constrain business activity as long as formal institutions able to bridge the trust gap exist. However, the absence of such formal institutions in many countries highlights the crucial role of trust in nurturing entrepreneurial spirit. Fafchamps (2002) [29] emphasizes this thesis for Sub-Saharan African countries. While Berggren and Jordahl (2006) [30] underscore the link between social capital and economic freedom, Hafer and Jones (2015) [31] instead stress the connection between economic freedom and entrepreneurship. The present paper goes beyond both preceding views by directly linking entrepreneurship to trust.

The research question this paper seeks to answer is whether trust is necessary in order for entrepreneurial activity to flourish. An empirical answer to this question would offer great insight into why some countries have better entrepreneurial cultures than others. Also, to the extent that the literature (e.g., Holcombe, 1998 [32]; Caree and Thurik 2003 [33]; Audretsch, *et al.*, 2006 [34]; Kirzner, 1997 [35]; and Lazear, 2004 [36] and 2005 [37]) attributes a significant role in economic development to entrepreneurship, understanding what drives entrepreneurship is helpful not only in understanding why some countries have superior entrepreneurship culture, but also why some countries are more developed than others.

The paper performs a cross-sectional analysis on 60 countries for the year 2010. The data for entrepreneurship is from the recently published Global Entrepreneurship Monitor (GEM) by Acs and Szerb (2010) [38]. Following the literature, we use the trust variable from the World Values Survey which measures the extent to which people trust each other. Applying these two metrics constitutes the novelty of this paper, as we take a broader view of entrepreneurship than most prior studies. Moreover, our trust variable has a wider acceptance and is more comparable at the national level.

Furthermore, another major innovation of this paper is the use of the cross-sectional approach at the national level. Despite several studies conducted on the relationship between social capital and small to medium-sized businesses, few have employed this technique as confirmed by Geindre and Dussuc (2012 [39]: p. 12)¹.

We employed a two-stage least squares (2SLS) methodology using suitable instruments to control for endogeneity of the entrepreneurship variable. The findings do suggest that trust has a strong positive impact on entrepreneurship, and the result is robust to the presence of outliers, continental/regional clustering and alternative conditioning variables. Quantitatively, our results indicate that about half of the variability in entrepreneurial spirit across the world is driven by trust considerations. Further empirical analysis points to a causality running from trust to entrepreneurship.

The rest of the paper is organized as follows: Section 2 discusses the conceptual framework of the paper; while Section 3 discusses the data. Section 4 presents the methodology, while Section 5 presents and discusses the empirical results. Section 6 concludes the study.

2. Conceptual Framework

The role of trust in entrepreneurship is not novel. As we have already noted, trust is essential to entrepreneurship. A number of authors, notably Chabaud and Ngijol, (2005) [40], Bhagavatula *et al.*, (2010) [41], and Audretsch *et al.* (2011) [42], have shown that by creating room for new opportunities, trust enables entrepreneurship. Some other authors have shown that trust facilitates the creation of enterprises, (e.g., Mueller, (2006) [43], Davidsson and Honig, (2003) [44], Rodríguez and Santos, (2007) [45], Clarke and Chandra, (2011) [46] and Deakins *et al.* (2007) [47]), whereas others suggest that trust promotes access to other resources (e.g., Baron and Markmann, (2003) [48], Runyan *et al.*, (2006) [49], Honig *et al.*, (2006) [50] and Packalen, (2007) [51]). Trust has also been found to be

¹ This study focuses on the period from 2002 to 2011.

indispensable to the birth of new enterprises (e.g., Geindre (2009) [52] and Aarstad *et al.*, (2010) [53]) and also for the growth and development of small- and medium-sized enterprises (e.g., Bosma *et al.* (2004) [54], Mosek *et al.* (2007) [55], Han, (2007) [56] and Coviello and Cox, (2007) [57]). While certainly informative and relevant, most of these previous studies linking trust to entrepreneurship have utilized a microeconomic or management framework. There is therefore need for a macroeconomic perspective on the subject, which is the object of the present study.

Although some studies have empirically investigated the importance of trust in entrepreneurship, through its effect on innovation (e.g., Akçomak and ter Weel, 2009 [20]; Doh and Acs, 2010 [58]), most empirical studies did not look specifically at the relationship between trust and entrepreneurship. Because trust affects innovation, we can logically think that trust would be useful in entrepreneurship because it is the foundation of innovation.

We define a production function² of entrepreneurship as follows:

$$Q = Q(T^\theta, Z) + \varepsilon \quad (1)$$

where Q represents entrepreneurship, T , trust, Z traditional determinants and ε , unobservable factors influencing Q . θ measures the externalities related to social capital. If $\theta > 0$, we deduce that $\frac{dQ}{dT} > 0$, social capital thus increases entrepreneurship. If $\theta = 0$, entrepreneurship is orthogonal to T , and if $\theta < 0$, distrust reduces the spirit of entrepreneurship.

Simply put, we can settle for $0 < \theta < 1$, where the average increase in social capital has a positive impact on entrepreneurship.

There are many reasons to consider a relationship between these two variables, as the work cited above suggests. Akçomak and ter Weel (2009) [20] believe it is easier to finance entrepreneurial activity based simply on the reputation of a company or a person. This in turn can help to create a business or to support a business. Starting a business is not always an individual process: the idea could flourish or die depending on the level of trust and the surrounding business environment. Retention of information is difficult in the presence of a higher trust, which minimizes the asymmetry of information, further lowering the cost of information and transactions. One can easily get leads for his or her company, so we can develop entrepreneurial attitudes exchanging with entrepreneurs from various backgrounds. It is also understandable that trust stimulates the ambition to become an entrepreneur or encourages development of these same attitudes.

3. Data and Descriptive Findings

Following the tradition in the literature, we use the World Values Survey (WVS) trust indicator which surveys the proportion of a population that answers “yes” to the fundamental question: “in general, do you think that most people can be trusted, or can’t you be too careful?” WVS data for a number of countries has been available since 1981 and is generally accepted as a reliable indicator of trust at the aggregate level. National social trust scores have proved it to be a fairly valid measure of honesty, trust, and trustworthiness. Furthermore, this indicator has been widely utilized in previous works.

Data for the aggregate national entrepreneurship activity is obtained from the Global Entrepreneurship and Development Index (GEDI) of Acs and Szerb (2010) [38]. Both the GEDI are comprehensive and multi-dimensional datasets, which seek to uncover the different conditions, including the underlying environment underpinning entrepreneurial success at the micro level. GEDI is a composite index comprising three sub-indexes namely: entrepreneurial attitude, entrepreneurial activity and entrepreneurial ambition. The global entrepreneurship index is the simple arithmetic

² See Doepke and Zilibotti (2014) [59] for a model.

average of the three sub-indexes. The entrepreneurial attitude sub-index measures the attitude and dispositions of the population of a country towards entrepreneurship, while the entrepreneurial activity sub-index measures the proportion of the population engaged in entrepreneurial activity. Both sub-indexes are influenced by factors such as, market size, level of education of the population, and the business environment in the country. In an attempt to capture the likely influences of these exogenous factors on entrepreneurial spirit, Acs and Szerb (2010) [38] suggested another much more complex sub-index—the entrepreneurial ambition sub-index—which basically captures individuals' ability to create new enterprises. The GEDI database covers 71 countries. However, due to missing data for some of the control variables, our study covers only 60 countries.

Acs and Szerb (2010 [38]: p. 6) assert:

“there should be detailed information about the applied data set and the sources of the variables. The 14 individual pillars of entrepreneurship used in the construction of our index are calculated by involving more than 963,000 individuals from the 71 countries. The pillars themselves are constructed through an interaction of individual level and institutional variables. All of the institutional variables are from the Global Competitiveness Index; others are from the Doing business, Index of economic Freedom or from multinational organizations such as the UNIDO or OECD. While we tried to find a single institutional variable for each of the individual variables, sometimes it proved to be not executable. Therefore some of these institutional variables are themselves complex ‘indexes’. Comparing to the previous versions of our index, we avoided the duplication or the multiplication of the same institutional factors in different part of the index.”

Table 1 describes the sources of different variables included in this study.

Table 1. Data Sources.

Variables	Sources
Entrepreneurship	Acs and Szerb, (2010) [38].
Gini	GINI coefficient (UNDP, Human Development Report, 2004 [60])
Post-communist	Dummy variable. Author's own
Economic freedom	2010 Index of Economic Freedom (Heritage Foundation [61])
Social trust	World Values Survey (2010) [62]
IQ	Lynn and Meisenberg, (2010) [63]
Regulatory quality	World Bank Governance indicator. The measures come from the dataset compiled by Kaufmann, Kraay and Mastruzzi at the World Bank, (2010) [64]
MENA	Dummy variable. Author's own
High income	Dummy variable. Author's own
East Asia and Pacific	Dummy variable. Author's own
Sub-Saharan Africa	Dummy variable. Author's own
Education 1 (average years of schooling in population aged 25 and above)	Barro and Lee (2011) [65]
Education 2 (average years of schooling in population aged 15 and above)	Barro and Lee (2011) [65]
Log GDP per capita	Pen World Tables 7v (2010) [66]
Africa	Dummy variable. Author's own
Americas	Dummy variable. Author's own
Asia	Dummy variable. Author's own
Europa	Dummy variable. Author's own
Oceania	Dummy variable. Author's own

Notes: The empirical analysis of the data follows two steps: the summary descriptive statistics and then the analysis of partial correlations.

Table 2 presents the summary descriptive statistics of the variables used in this study. It follows from the analysis of individual country statistics for the two key variables of interest, namely, entrepreneurial spirit and trust, that Uganda received the lowest score for the entrepreneurship variable, while Denmark received the highest. The mean score position was earned by Japan, and the coefficient of variation of 46.15 suggests great heterogeneity in entrepreneurial spirit amongst the countries included in the study. Regarding the trust variable, Sweden received the highest score, Russia was at the mean score position, and Brazil received the lowest. Again the coefficient of the variation of 51.18 suggests great heterogeneity in trust amongst countries.

Table 2. Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Entrepreneurship	60	0.39	0.18	0.1	0.76
Gini	54	36.65	9.39	24.00	59.00
Post-communist	60	0.20	0.40	0.00	1.00
Economic freedom	60	66.20	10.25	37.10	89.70
Trust	53	30.42	15.57	5.77	64.27
IQ	59	93.19	8.28	72.00	108.00
Regulatory quality	52	0.58	0.90	−1.35	1.94
MENA	60	0.18	0.39	0.00	1.00
High income	60	0.53	0.50	0.00	1.00
East Asia and Pacific (EAP)	60	0.03	0.18	0.00	1.00
Sub-Saharan Africa (SSA)	60	0.02	0.13	0.00	1.00
Education 1	51	8.97	2.43	3.86	13.09
Education 2	51	9.14	2.15	4.32	12.75
Log GDP per capita	52	9.51	1.44	4.86	12.44
Africa	60	0.10	0.30	0.00	1.00
Americas	60	0.10	0.30	0.00	1.00
Asia	60	0.28	0.45	0.00	1.00
Europa	60	0.35	0.48	0.00	1.00
Oceania	60	0.18	0.39	0.00	1.00

Figure 1 presents the scatter plot between entrepreneurship (*y*-axis) and trust (*x*-axis), and sub-indexes of entrepreneurship and trust for the countries included in our sample. The evidence clearly suggests a positive relationship between these two variables. This positive relationship is further confirmed in Table 3 by a strong, statistically significant (at 1%) correlation coefficient of 0.71. The same conclusion is obtained when analyzing the relationship between each of the four remaining measures of three sub-indexes and trust. The estimated coefficient of β from each of the simple linear regression models or ordinary least squares (OLS) model is positive and strongly significant = 0.008 (at 1%) when the dependent variable is entrepreneurial attitudes; $\beta = 0.010$ (at 1%) when the dependent variable is entrepreneurial activity; $\beta = 0.006$ (at 1%) when the dependent variable is entrepreneurial aspiration. In each of the simple regression models, trust explains more than one-third of the variations in three sub-indexes: 41.5% of the variations in entrepreneurial attitudes, 30.5% of the variations in voice and accountability, 53.6% of the variations in entrepreneurial activity and 31.6% of the variations in entrepreneurial aspiration. In addition, the correlation coefficients between trust and each of sub-indexes are important.

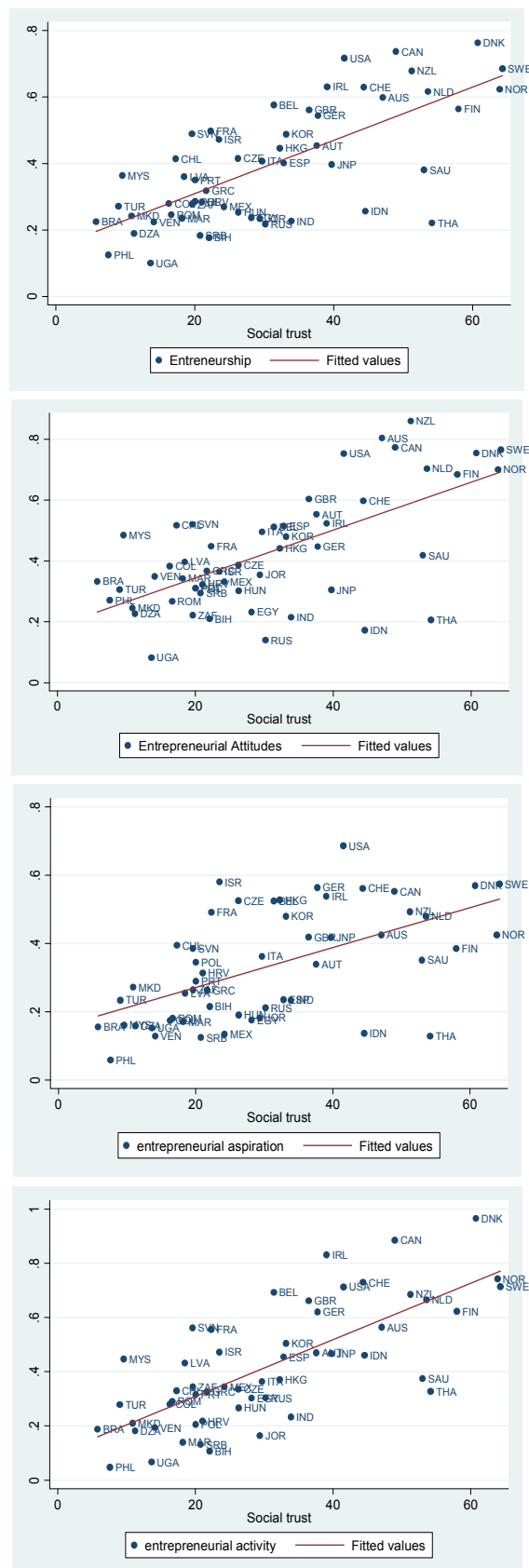


Figure 1. Entrepreneurship and Trust.

Table 3. Matrix of Correlation Coefficients.

	1	2	3	4	4	5	6	7	8	9	10	11	12	13
1 Entrepreneurship	1.00													
2 Gini	−0.41	1.00												
3 Post communist	−0.23	−0.27	1.00											
4 Economic freedom	0.79	−0.27	−0.21	1.00										
5 IQ	0.68	−0.62	0.18	0.54	1.00									
6 Trust	0.71	−0.47	−0.27	0.56	0.51	1.00								
7 Regulatory quality	0.79	−0.48	−0.02	0.79	0.70	0.49	1.00							
8 Log GDP per capita	0.76	−0.41	0.00	0.64	0.71	0.56	0.73	1.00						
9 Education 1	0.72	−0.45	0.20	0.66	0.77	0.43	0.73	0.83	1.00					
10 Education 2	0.70	−0.42	0.17	0.67	0.75	0.42	0.72	0.83	0.99	1.00				
11 High income	0.19	−0.20	0.05	0.13	0.37	0.08	0.30	0.12	0.34	0.31	1.00			
13 Entrepreneurial activity	0.95	−0.40	−0.24	0.73	0.62	0.74	0.74	0.69	0.63	0.62	0.60	1.00		
14 Entrepreneurial aspiration	0.90	−0.45	−0.11	0.71	0.66	0.55	0.74	0.69	0.76	0.73	0.80	0.90	1.00	
12 Entrepreneurial attitudes	0.92	−0.30	−0.26	0.75	0.61	0.65	0.71	0.74	0.64	0.64	0.81	0.92	0.72	1.00

Considering that entrepreneurial spirit (and sub-indexes) is a function of many different factors, these correlative figures must not be deemed final until further examination of the partial correlation of these other variables with entrepreneurial spirit and trust is undertaken. This is the objective of Table 3. As expected, the evidence in Table 3 suggests that entrepreneurship is strongly correlated with many other variables, such as, economic freedoms, human capital and regulatory quality. Hence, the relationship presented in Figure 1 might change or weaken in strength once these other variables are taken into account.

4. Empirical Model

The question we seek to answer in this study is whether differences in trust levels between countries can explain observed differences in entrepreneurial spirit amongst these countries. We specify a regression model of the form (following Hafer and Jones (2015) [31]):

$$\text{Entrepreneurship}_i = \alpha + \beta \text{Trust}_i + \delta \text{Control}_i + \varepsilon_i \quad (2)$$

where for entrepreneurship, we use GEDI as the main indicator. Subsequently, we will use entrepreneurial attitude, entrepreneurial activity and entrepreneurial ambition as alternative proxies for entrepreneurship. Trust is our variable of interest and thus the parameter of interest is β . $\text{Control}_i = (x_1; \dots; x_n)$ is a vector of control variables, including the following: a dummy of high income countries, dummy variable for post-communist countries, the index of economic freedoms, human capital variables³ (IQ, years of schooling), indices of inequality (Gini), and a dummy to capture different geographical factors (namely regional dummies). ε_i is the error term; i represent the countries; α is the constant and δ represents the coefficient of control variables.

Following Bjørnskov and Foss (2008) [67] and Hafer and Jones (2015) [31], we control for the influence of communism on entrepreneurial spirit by including a dummy variable for former communist states. The idea is very simple for this variable: because communism is a system openly against private initiative, its impact on entrepreneurship must be taken into account. Also, following Bjørnskov and Foss (2008) [67] and Hafer and Jones (2015) [31], we include the Gini coefficient to control for income inequality. The idea is that sufficiently low incomes might constrain would-be entrepreneurs from realizing their dreams while also potentially motivating some other individuals into entrepreneurial activity as a means of breaking out of poverty. We also control for the level of development of a country by including a dummy for high income countries, the idea being that advanced countries necessarily provide more conducive environments for entrepreneurial activity. The evidence in Glaeser, Kerr and Ponzetto (2010) [68] and Glaeser, Rosenthal and Strange (2010) [69] suggests that entrepreneurial activity flourishes most in urban centers, and advanced countries have more urban centers than underdeveloped countries. The data on high level of income levels come from Kalonda-Kanyama and Kodila-Tedika (2012) [70]. Acs (2010) [71] has found higher levels of education to be associated with higher levels of entrepreneurial activity, while Hafer and Jones (2015) [31] have recently shown that entrepreneurial spirit is a positive function of the level of IQ (intelligence quotient). Thus, human capital being an important driver of entrepreneurial activity, we control for this by including the IQ⁴ and the average years of schooling. We measure intelligence using the IQ data by Lynn and Meisenberg (2010) [63], which has also been used by Jones and Schneider (2010) [73] and Hafer and Jones (2015) [31]. Following Bjørnskov and Foss (2008) [67]; and Hafer and Jones (2015) [31], we include a measure of economic freedom to control for the influence of economic freedom on entrepreneurship. Finally, we include regional dummies to take into account the specificities of different regions of the world.

³ As suggested in the literature (see, Hafer and Jones, 2015 [31]), both variables—IQ and schooling years—can be maintained in the same regression so as to capture competing aspects of human capital.

⁴ See Lynn and Vanhanen (2012) [72] for literature on this subject.

We perform our analysis on the empirical model specified in Equation (1) above using essentially ordinary least square (OLS) regression model. To correct for likely heteroscedasticity, we present white-corrected standard errors.

Reverse causality is a concern in this study. Indeed, trust is a variable that is not entirely endogenous. Trust at the national level may be affected by entrepreneurship. Some believe that in extreme cases, entrepreneurship encourages greed, which in turn creates mistrust through the exploitation that it generates. This is essentially the view of Marxist theories. If so, then variations in trust between citizens at the national level is driven by the spirit of enterprise—resulting in reverse causality. Furthermore, in our case, we can think, for example, of variables such as tax rates, and labor force participation, that have been omitted resulting in omitted variable bias. Two-stage least squares (2SLS) is employed to correct for the fact that we cannot control for all the possible sources of endogeneity in the association between trust and entrepreneurship. This technique requires the instruments to be correlated with trust, but not correlated with entrepreneurship. The instruments used are those that have been used in Bjørnskov (2010 [16], 2012 [17]), namely: monarchy, the pronoun drop, and average temperature. The author theoretically justifies these instruments as follows:

“I firstly include a dummy for whether countries are monarchies, which Bjørnskov (2007) finds to be approximately eight percentage points more trusting than countries without hereditary institutions. Secondly, I follow Tabellini’s (2008) approach of study in including a dummy variable for whether a country’s predominant language allows dropping the subjective pronoun, that is, Chomsky’s (1981) ‘pro-drop’ characteristic. Tabellini’s argument rests on Kashima and Kashima (1998) in arguing that cultures in which the language forbids dropping the personal pronoun traditionally have been more respectful of individual rights and have therefore developed stronger trust norms” (Bjørnskov, 2012:6) [. . .]These are supplemented by the average temperature in the coldest month of the year, based on the premise, dating back to Aristotle, that trust and social cohesion historically has been relatively more important for survival in regions with cold winters, and that cultures of such regions may have selected high-trust institutions through an evolutionary process”. (Bjørnskov, 2010 [16]: p. 336)

Beyond the use of these dedicated instruments, we use standard statistical approaches to validate them. On the one hand, we use the Sargan and Hausmann tests for over-identifying, the results subsequently accompanying each estimate; and, on the other, we look at the behavior of these instruments in the first stage of regressions. These regressions are presented in Table 4.

Table 4. First-stage regressions.

	Social Trust			
	Entrepreneurship	Entrepreneurial Attitudes	Entrepreneurial Activity	Entrepreneurial Aspiration
Monarchy	5.214 (3.946)	7.197 ** (3.672)	7.197 ** (3.672)	7.197 ** (3.672)
Pronoun drop	10.819 *** (3.813)	8.709 ** (3.820)	8.709 ** (3.820)	8.709 ** (3.820)
Temperature	0.124 (0.262)	−0.360 (0.281)	−0.360 (0.281)	−0.360 (0.281)
R^2	0.86	0.84	0.84	0.84
Obs	39	39	39	39

Notes: Absolute values of t -statistics appear in parentheses * $p < 0.05$; ** $p < 0.1$; *** $p < 0.01$. All regressions are estimated using White’s (1980) [74] heteroscedasticity correction. All regressions include a constant term.

All regressors in the following table are inserted into these estimates. We reproduce the coefficients of instrumental variables. We observe the significance of all the instruments, except temperature. We therefore proceed with these results to estimate the 2SLS with these instruments.

To further test the robustness of our results, and to remain consistent with the approach by Bjørnskov (2010) [16], we consider the influence of outliers. The approach is to eliminate outliers using both the Student test and the iteratively weighted least squares (IWLS) techniques. These two current techniques therefore permit verification of whether the results found are not driven by the presence of outliers. As a further test of robustness, we use regional clusters to account for regional heterogeneity and also use alternative conditioning variables.

5. Econometric Findings

5.1. Regression Results with the Global Entrepreneurship and Development Index (GEDI)

5.1.1. Main Regression Results

The main regression results are presented in Table 5. The results in Model 1 show a positive and highly statistically significant relationship between trust and entrepreneurship, essentially confirming Figure 1's theoretical predictions. The relationship between trust and entrepreneurship weakens in magnitude and statistical significance (now significant at the 10% level) when all other controls (excluding controls for regional specificities) are included, as Model 2 suggests. This relationship remains intact when the model is extended to include regional dummies⁵ (Model 3). Model 4 employs the 2SLS technique and uses the variables pronoun drop, monarchy and average temperature as instruments—the instruments are those of Bjørnskov (2010 [16], 2012 [17]). The *p*-values from the Sargan and Hausman test validate our approach, and the empirical results in Model 4 indicate that the causality runs from trust to entrepreneurship.

Table 5. Main Regression Results.

Variables	Model 1	Model 2	Model 3	Model 4
Trust	0.008 *** (0.001)	0.003 * (0.001)	0.003 * (0.001)	0.006 ** (0.003)
Gini		−0.000 (0.002)	−0.001 (0.002)	0.002 (0.004)
Post-communist		−0.091 * (0.048)	−0.106 * (0.045)	−0.037 (0.093)
IQ		0.004 (0.003)	0.004 (0.003)	0.004 (0.004)
Economic freedom		0.006 * (0.003)	0.006 * (0.002)	0.004 (0.003)
High income		−0.010 (0.028)	−0.019 (0.027)	−0.007 (0.041)
Education 1		0.022 * (0.010)	0.019 * (0.008)	0.012 (0.015)
SSA			0.010 (0.032)	0.051 (0.068)
MENA			−0.076 ** (0.045)	−0.083 (0.072)
EAP			−0.074 ** (0.041)	−0.138 (0.103)
<i>R</i> ²	0.50	0.82	0.83	0.86
Obs	53	47	47	39
Sargan				0.30
Basmann				0.42
OLS	Yes	Yes	Yes	No
2SLS	No	No	No	Yes

Notes: Absolute values of *t*-statistics appear in parentheses * *p* < 0.05; ** *p* < 0.1; *** *p* < 0.01. All regressions are estimated using White's (1980) [74] heteroscedasticity correction. All regressions include a constant term.

⁵ Some regions were dropped due to multicollinearity.

The results in Table 5 thus confirm the strong explanatory power of trust on entrepreneurship. In particular, trust explains about 50 percent of the variation in entrepreneurial spirit in the sample of countries considered. Other determinants found to have an important impact on entrepreneurship include: former communist background, economic freedoms, and human capital. While a former communist background was found to negatively affect entrepreneurship, economic freedom and human capital (measured by the average years of schooling) instead have a strong positive impact. The statistical significance of the former communist background variable is, however, unstable and changes with the introduction of controls for regional specificities.

The likely intuition for this could be that former communist countries that fail to undertake institutional reforms to favor entrepreneurship are likely going to continue witnessing the detrimental effects of communism, whereas those countries that reform their institutions to make them conducive to entrepreneurship are less likely to suffer the negative effects.

Income inequality measured by the Gini coefficient has a negative but statistically insignificant effect on entrepreneurship while the level of development of a country, as well as all the regional dummies, are statistically insignificant. If anything, the lack of statistical significance of the Sub-Saharan African dummy suggests that entrepreneurial weakness is not purely a Sub-Saharan African phenomenon. If one would pursue the argument further, the positive sign on the Sub-Saharan African dummy as opposed to the negative signs on the Middle-East and North Africa (MENA) and East Asia and Pacific dummies; suggests that entrepreneurship can evolve favorably in Sub-Saharan Africa if certain conditions, probably institutional reforms, are met.

We test for the robustness of our main results in the next section (Section 5.1.2).

5.1.2. Robustness Checks

We conduct two forms of robustness checks: (1) continental clustering outlier observations and endogeneity (Table 6); and (2) using alternative conditioning variables, outlier observations and endogeneity (Table 7). It makes sense to perform a continental clustering considering the extent of heterogeneity observed in both variables—trust and entrepreneurship—across countries included in our sample. We would have wished to use an alternative variable for trust in our robustness checks, but the non-availability of suitable proxies prevented this option. We were thus left with the sole option of using alternative conditioning variables, which is the approach that has been used in some studies (see, notably, Potrafke (2012) [75]). There are a number of differences between the conditioning variables in our main results (Table 5) and Table 7. First, instead of economic freedom used in Table 5, we use regulatory quality in Table 6. Also, instead of education 1 (average years of schooling in population aged 25 and above) used in Table 5, we use instead education 2 (average years of schooling in population aged 15 and above) in Table 6. We also use a dummy variable for GDP per capita instead of high income countries. Finally, we use dummies for regional classification of countries instead of continents. Of course, the decision to use alternative proxies for economic freedom and human capital is justified by the fact that both variables were significant in our main regression. As we have already explained, the ideal robustness check would involve using alternative proxies for the principal explanatory variable (trust), but data constraints limited this option. We were thus left with the option of using alternative proxies for the chief conditioning variables, hoping to minimize bias in our results that would have been brought about by measurement errors in our conditioning variables.

Table 6. Robustness Checks Using Regional Clusters, Outliers and Endogeneity.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Trust	0.008 *** (0.002)	0.003 * (0.000)	0.029 * (0.001)	0.003 * (0.001)	0.003 * (0.001)	0.003 * (0.001)	0.008 * (0.004)
Gini		−0.000 (0.001)	−0.001 (0.001)	−0.000 (0.002)	−0.001 (0.002)	−0.001 (0.002)	0.004 (0.006)
Post-communist		−0.091 * (0.026)	−0.106 * (0.026)	−0.129 ** (0.043)	−0.115 ** (0.041)	−0.120 * (0.049)	−0.022 (0.110)
IQ		0.004 (0.002)	0.004 (0.002)	0.003 (0.002)	0.003 (0.003)	0.004 (0.003)	0.004 ** (0.004)
Economic freedom		0.006 (0.003)	0.006 (0.003)	0.005 (0.002)	0.008 *** (0.002)	0.005 * (0.002)	0.004 (0.005)
High income		−0.010 (0.020)	−0.018 (0.019)	−0.005 (0.024)	−0.014 (0.023)	−0.012 (0.030)	0.020 (0.049)
Education 1		0.022 (0.011)	0.019 (0.011)	0.022 (0.008)	0.019 * (0.007)	0.020 * (0.010)	0.011 (0.014)
SSA			0.010 (0.030)	−0.015 (0.034)	0.023 (0.037)	−0.021 (0.064)	−0.019 * (0.043)
MENA			−0.076 * (0.035)	−0.071 (0.045)	−0.047 (0.043)	−0.076 * (0.044)	−0.033 ** (0.068)
EAP			−0.074 (0.044)	−0.069 (0.044)	−0.023 (0.041)		−0.134 *** (0.093)
R ²	0.50	0.82	0.83	0.86	0.87		0.88
Obs	53	47	47	46	45	47	37
Outliers				Slovenia	Slovenia Venezuela		Slovenia Venezuela
IWLS	No	No	No	No	No	Yes	No
OLS	Yes	Yes	Yes	Yes	Yes	No	No
2SLS	No	No	No	No	No	No	Yes

Notes: Absolute values of *t*-statistics appear in parentheses * $p < 0.05$; ** $p < 0.1$; *** $p < 0.01$. All regressions are estimated using White's (1980) [74] heteroscedasticity correction, except Models 4, 5 and 6. All regressions include a constant term.

In Models 4 and 5 of Table 6, we control for the influence of outliers on our main results. The residuals from the Student test allow us to eliminate only Slovenia from Model 4, while both Slovenia and Venezuela were eliminated from Model 5. Besides diminishing the magnitude of the coefficient of the trust variable, the exclusion of these countries from the sample does not significantly reduce the impact of trust on entrepreneurship. However, the impact of economic freedoms and education—which previously were insignificant—becomes statistically important, while communism also gains in statistical significance. However, the inconvenience associated with the estimation of Models 4 and 5 is that we lose a great deal of degrees of freedom owing to the limited number of observations. To correct for this, we proceed alternatively by maintaining the same specification as in Models 4 and 5, although this time we employ a different econometric technique: the IWLS technique (see Model 6). The empirical observation in Model 6 is that this also does not substantially change our main results. In other words, the impact of trust on entrepreneurship is robust to the presence of outliers. Model 7 explores the 2SLS technique on the empirical specification of Model 5, which is a dual means of controlling for likely simultaneity and for the presence of outliers. The results confirm a positive, statistically significant impact of trust on entrepreneurship. Using alternative conditioning variables and controlling for the presence of outliers and endogeneity in Table 7 basically upholds our main result: that trust matters for entrepreneurial spirit.

Table 7. Robustness checks using alternative conditioning variables, outliers and endogeneity.

Variables	Model 1	Model 2	Model 3	Model 4
Trust	0.004 *** (0.001)	0.003 * (0.001)	0.003 * (0.002)	0.007 * (0.003)
Gini	0.001 (0.002)	0.001 (0.003)	−0.001 (0.003)	0.004 (0.005)
Post-communist	−0.084 ** (0.042)	−0.099 * (0.043)	−0.113 * (0.051)	−0.076 (0.074)
IQ	0.003 (0.002)	0.004 (0.004)	0.003 (0.004)	0.006 (0.004)
Regulatory quality	0.075 *** (0.024)	0.075 *** (0.028)	0.086 ** (0.030)	0.023 (0.039)
Log GDP per capita	0.012 (0.016)	0.007 (0.021)	−0.010 (0.022)	−0.002 (0.026)
Education 2	0.015 (0.010)	0.017 ** (0.010)	0.019 (0.013)	0.024 * (0.013)
Africa		0.014 (0.075)	−0.032 (0.086)	0.0061 (0.076)
Asia		−0.027 (0.084)	−0.104 (0.087)	−0.071 (0.078)
Europe		−0.022 (0.063)	−0.069 (0.081)	−0.000 (0.057)
Oceania		0.008 (0.057)	−0.035 (0.083)	−0.024 (0.051)
Americas		−0.004 (0.075)	−0.035 (0.090)	0.017 (0.073)
R ²	0.82	0.83		0.88
Obs	47	47	47	37
IWLS	No	No	Yes	No
OLS	Yes	Yes	No	Yes
2SLS	No	No	No	No
Outliers	Slovenia Venezuela			

Notes: Absolute values of *t*-statistics appear in parentheses * $p < 0.05$; ** $p < 0.1$; *** $p < 0.01$. All regressions are estimated using White's (1980) [74] heteroscedasticity correction except model 3. All regressions include a constant term.

As observed in Tables 6 and 7 both specifications do not fundamentally change our main finding that trust matters for entrepreneurial spirit.

5.2. Regression Results with Sub-Indexes

Regressions in Table 8 relate to the components of GEDI. We consider the same control variables as in the previous tables. Estimates are made in two stages. Initial estimates using the explanatory variables in Table 5. The explanatory variables in Table 7 are used in the second part of the Table 8.

Table 8. Result with sub-indexes.

	Entrepreneurial Attitudes			Entrepreneurial Activity			Entrepreneurial Aspiration		
Trust	0.004 * (0.002)	0.003 ** (0.001)	0.013 *** (0.004)	0.005 *** (0.002)	0.006 *** (0.002)	0.008 (0.006)	0.000 (0.001)	0.000 (0.001)	−0.001 (0.004)
Method	OLS	IWLS	2SLS	OLS	IWLS	2SLS	OLS	IWLS	2SLS
R ²	0.7538		0.83	0.7693		0.78	0.76		0.77
Obs	47	47	47	47	47	47	47	47	39
Sargan			0.198			0.303			0.082
Basmann			0.308			0.428			0.148

Table 8. Cont.

	Entrepreneurial Attitudes			Entrepreneurial Activity			Entrepreneurial Aspiration		
	Robustness Checks Using Alternative Conditioning Variables								
Trust	0.003 *	0.003	0.010 *	0.006 ***	0.006 ***	0.006	0.001	0.001	0.001
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.005)	(0.001)	(0.001)	(0.004)
Method	OLS	IWLS	2SLS	OLS	IWLS	2SLS	OLS	IWLS	2SLS
R ²	0.76		0.84	0.76		0.77	0.72		0.70
Obs	39	39	39	39	39	39	39	39	39

Notes: Absolute values of *t*-statistics appear in parentheses * $p < 0.05$; ** $p < 0.1$; *** $p < 0.01$. All regressions are estimated using White's (1980) [74] heteroscedasticity correction except model 3. All regressions include a constant term.

For entrepreneurial attitudes, trust is statistically related to this variable. This relationship goes beyond a correlation; we are in the presence of causality. However, the single linear relationship observed between the two variables, entrepreneurial aspiration and trust, in Figure 1 disappears completely. We thus find a similar result by changing certain variables by other measures and estimation techniques.

6. Conclusions

This paper sought to investigate whether differences in trust levels between countries can explain differences in entrepreneurial spirit amongst them. We employed a 2SLS methodology using suitable instruments to control for endogeneity of the entrepreneurship variable. The findings suggest that trust has a strong, positive impact on entrepreneurship and the result is robust to the presence of outliers, continental/regional clustering and alternative conditioning variables. Quantitatively, our results indicate that about half of the variability in entrepreneurial spirit across the world is driven by trust considerations. Our study extends existing knowledge by empirically investigating the association between entrepreneurship and trust from a macroeconomic perspective. Moreover, to the extent that the theoretical literature attributes a great role of entrepreneurship in economic development, understanding what drives entrepreneurship is helpful not only in understanding why some countries have a superior entrepreneurship culture, but also why some countries are more developed than others.

The implications of these findings are that, to spur entrepreneurial spirit, countries that lack formal trust-building institutions, such as Sub-Saharan African countries, can benefit from creating conditions that favor the expansion of informal networks where trust is cultivated.

However, our study has been limited by a number of factors: sample size, a single time period of study, the lack of a rigorous treatment of endogeneity issues, and an inadequate exploration of the transmission mechanisms between trust and entrepreneurship. Further studies should consider probing deeper into these important issues.

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