Individualistic Culture and Entrepreneurial Opportunities *

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Abstract

The present paper evaluates the effect of the cultural trait "individualism" on opportunity entrepreneurship, using cross-country data from the Global Entrepreneurship Index (GEI) in 2017. Individualism emphasizes freedom and rewards one's own personal achievements. Combining the fractional probit regression model with an instrumental variable approach, we find that the number of opportunity startups is higher in individualistic countries. Part of this effect is indirect and occurs because individualistic people perceive opportunities in a more optimistic way, because they pretend to realize personal aims and because startups in individualistic countries are more innovative. These findings are also robust to differences in institutions, religious affiliation, fertility, unemployment, education and wealth.

Keywords: Individualism, Entrepreneurship, Opportunity perception, Innovation, Fractional Probit
JEL Classification: L26, C26, D22, O31

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1 Introduction

In the Schumpeterian perspective, business dynamism is the key to innovation and growth. Meanwhile, globalization and technological progress has been increasing the importance of entrepreneurship for economic growth and has been leading to the emergence of an entrepreneurial economy (Audretsch and Thurik 2000). Explaining the huge differences across countries in levels of business activity and in the motivation for entrepreneurs (necessity vs. opportunity driven) is still a major topic (Acs *et al.* 2008). Education, macroeconomic as well as institutional conditions are known to be responsible for the divergent levels of entrepreneurial activity. Another explanation that recently gained attention is the national culture (Bauernschuster *et al.* 2012; Davidsson and Wiklund 1997; Fernández-Serrano *et al.* 2018; Kreiser *et al.* 2010; Urbano and Alvarez 2014). By their very nature, entrepreneurs are always seeking, reacting to and exploiting changes (perceived by them as opportunities). After all, business activities are carried out by persons who live in specific cultural and social conditions. Therein, positive or negative perceptions, even those that are shared by a society, may strongly influence of potential and existing entrepreneurial ambitions (Acs *et al.* 2017).

The present paper is dedicated to the question of whether individualism positively affects the number of opportunity startups. For Fincher *et al.* (2008), Hofstede (1980); Hofstede *et al.* (2010) and many other intercultural psychologists, the distinction between individualism and collectivism is the main dimension of cultural variation. Individualism is a cultural trait which emphasizes freedom, personal fulfillment, encouragement of change and deviation from the status quo. Collectivism, in contrast, emphasizes the incorporation of individuals into a larger group, encouraging loyalty, respect for superiors and discouraging individuals to stand out. Based on this reasoning, a few papers already show that the cultural dimension individualism vs. collectivism plays a key role in stimulating innovation and economic growth (Gorodnichenko and Roland 2017; Shane 1993) and that the degree of individualism is positively correlated with entrepreneurial activity (Fernández-Serrano *et al.* 2018; Kreiser *et al.* 2010).

With regard to the previous literature, we make three contributions. First, instead of using an indicator for the total entrepreneurial activity, we use the number of opportunity startups, i.e., startups that were created because the entrepreneur perceived a good opportunity (as opposed to necessity startups) or because of the desire to satisfy personal aims. This novel index is provided by the latest version of the Global Entrepreneurship Index (GEI) which, unlike its previous versions, also has the advantage of controlling for cross-country differences in taxation and other institutional characteristics. Second, the 2017 GEI allows us to investigate the transmission channels of the effect of individualism on opportunity startup creation. We reveal how much of the effect of culture is (a) direct, or operates indirectly (b) through entrepreneurs' different perceptions of opportunities in individualistic countries, or (c) because opportunities are in fact better as a result of facilitated access to product and process innovations, or (d) via institutional quality; Third, our identification strategy accounts for the possibility of reverse causality between entrepreneurship and culture using highly exogenous instruments based on genetic data and we combine the IV approach with a Fractional Probit Regression Model (FPRM) in order to correct for the fact that both individualism and our proxy for entrepreneurial activity are bounded

indices. We also show how well the (IV)-FPRM performs relative to the usual OLS and IV regressions.

Throughout all estimations and robustness checks, the data clearly indicate that the number of opportunity startups is higher in individualistic countries. Although the opportunity startup index is already adjusted for relevant regulatory differences, culture still may affect the behavior of entrepreneurs indirectly through institutions or other persistent features of countries (Dheer 2017; Greif and Tabellini 2017; Li and Zahra 2012; Pinillos and Reyes 2011). Indeed we find that it is important to control for differences in market size, unemployment, economic freedom, education, among others. These factors are apparently positively correlated with individualism, but, nevertheless, we find that culture has an independent effect on the number of opportunity startups. The results are also robust to differences in other potential factors that may confound the effect of culture on the behavior of entrepreneurs, such as religion, geography, or the effects of European colonization. In this aspect our paper adds to the growing literature on the connections between culture and institutions, see Alesina and Giuliano (2015) for a review.

What exactly makes potential entrepreneurs in individualistic countries more apt to take good opportunities? Exploiting other sub-pillars of the GEI, allows us to provide suggestive evidence for other indirect transmission channels. On the one hand, the data reveal that people in individualistic countries are more likely to evaluate an opportunity as being good. Note that this is truly an intrinsic perception of entrepreneurs, as differences in market size, economic freedom and other institutional factors are controlled for. This observation thus suggests that individualistic countries show higher opportunity startup rates because the citizens tend to be more optimistic regarding the evaluation of their future business, confirming preliminary conclusions in Verheul *et al.* (2002). On the other hand, we observe that, in line with Shane (1993), Mueller and Thomas (2001), Waarts and Van Everdingen (2005) and Gorodnichenko and Roland (2017), individualistic countries have a higher potential to create new products and that a larger number of startups use or create process innovations. Individualistic countries thus seem to favor opportunity startups since it is de facto easier to enter the market with a promising innovation.

The organization of this paper is as follows. In the second section, we review the literature on the subject and expose how our approach and its results complement previous findings. The third section explains our empirical strategy. The fourth section presents the data and some descriptive statistics. Sections five contain the main results, further investigations on the transmission channel of culture and robustness checks. Section six concludes.

2 Literature review and theoretical arguments

Despite the surge of attention and efforts of national and global policy makers to increase the rate of entrepreneurial activity (Wennekers *et al.* 2005), the latter remains modest in many nations (Acs *et al.* 2008; Liñán and Fernandez-Serrano 2014). Differences in the level of entrepreneurship, even among industrialized countries, are large and persistent (Fernández-Serrano *et al.* 2018). Moreover, a U-shaped relation between entrepreneurial activity and GDP per capita was

observed in more inclusive sample of countries (Acs *et al.* 2017; Pinillos and Reyes 2011).[1] This dilemma has sparkled interest among scholars to assess the factors that explain the differences in one's willingness to pursue entrepreneurial activities. There exist two broad lines of research on the determinants of entrepreneurship.

The first line stresses individual determinants of entrepreneurial activity, such as personality, attitude towards risk taking, autonomy, innovative spirit, competitiveness, pro activity and socioeconomic status (Simoes *et al.* 2016). The second one encompasses macro-environmental determinants of entrepreneurial activity. Market size and other GDP-related factors, however, seem insufficient to explain the cross-country variation of entrepreneurship, as the U-shaped relation indicates. Earlier evidence by Reynolds *et al.* (1999), for example, indicates that culture is a relevant component to explain these differences. Liñán and Fernandez-Serrano (2014) and Acs *et al.* (2008) agree that contextual factors rather than personal ones play the major role in explaining differences in the amount of entrepreneurial activity among nations. It still appears to be fruitful to expand the understanding of national entrepreneurship determinants, for it may address the issue of why only little nations are prone to an influx of business activities. The present paper follows this line of research.

According to Davidsson (1995) and Thurik and Dejardin (2011), culture may influence entrepreneurship by three main mechanisms: aggregate psychological traits, social legitimation, post-materialism and dissatisfaction perspective. The aggregate psychological traits approach highlights the role of culture as the personal attitudes towards entrepreneurship, or more specifically, the quantity of people with entrepreneurial values is important to improve the behavior of the entire society. The social legitimation approach presupposes that a support of the national culture will lead to a greater legitimacy of an entrepreneurial career, inducing more people to become entrepreneurs (Etzioni 1987). The post-materialism approach stresses the transformation from a culture dominated by materialistic-oriented individuals to a society in which an increasing proportion of the population prefers non-materialistic life goals over materialistic ones. From this perspective, being an entrepreneur contributes to an individual's personal satisfaction and liberty.

Yet, in considering the impact of culture on entrepreneurs and their endeavors, Corbett (2005) comes to the conclusion that there is little understanding of how culture may influence entrepreneurial thinking and decision-making approaches, considering that evidence is either contradictory (Nikolaev *et al.* 2018; Pinillos and Reyes 2011; Reynolds *et al.* 1999) or even insignificant, as in the case of Davidsson and Wiklund (1997), despite their careful design of a survey among inhabitants in Sweden. Recently, Laskovaia *et al.* (2017) analyze the mediating role of cognitive logic in explaining the performance of enterprises in different cultural contexts. The authors posit that business reasoning is not only shaped by the personal characteristics of entrepreneurs, but also by cultural aspects. Kreiser *et al.* (2010) provide firm-level evidence that cultural differences (in uncertainty avoidance, individualism, and power distance) affect proactiveness and risk taking behavior of entrepreneurs. In line with Williamson (2000), we adopt a

[1] Pinillos and Reyes (2011) conclude that individualism is not related to entrepreneurship in the same way across countries. In countries with low or medium level of development, the relation is negative, whereas only among the most developed countries, the relation between individualism and entrepreneurial activity is positive.

view of culture as informal institutions, and patterns of common behavior. According to this perspective, the social legitimation approach that explains why individuals and organizations behave in a certain way. With social legitimation, the actions as institutions serve to select and prioritize cultural practices reflected by behaviors of individuals in the society (Fischer *et al.* 2009). We adopt this approach and confirm that country-specific characteristics can shape the perception of opportunities and, ultimately, the number of opportunity startups.

Institutions are another important and extensively studied determinant of entrepreneurial activity. Li and Zahra (2012) and many other authors understand culture as a part of a country's informal institutional system. Both institutional and cultural factors are in the focus of Urbano and Alvarez (2014), Dreher and Gassebner (2013), or Aparicio *et al.* (2016) since these factors facilitate the identification, creation and exploration of opportunities (Verheul *et al.* 2002). For their interrelation with culture, a careful treatment of institutions is indispensable in the present study. In fact, it remains an open question whether individualism, and culture in general, have a mediating effect on institutions (Dheer 2017; Li and Zahra 2012) or whether the quality of institutions and the degree of development moderate the effect of cultural traits on entrepreneurship (Kyriacou 2016; Nikolaev *et al.* 2018; Pinillos and Reyes 2011).

The connection between innovation, culture and entrepreneurship has been a recurring topic at least since Hofstede (1980) original work on the cultural dimensions and the follow-up studies in this direction, for example, by Hayton *et al.* (2002). Innovation is recognized to be essential for creating value and sustaining competitive advantage (Michaelis *et al.* 2018). As such, the ability to create or adopt the latest technology and processes is a key element of successful startups. Consequently, we extend the analysis on the effect of individualism on the creation of firms to check if the relation is transmitted via the ability to create and adapt to innovations. Gorodnichenko and Roland (2012) add that individualism encourages innovation, because apart from the chance of receiving high future returns, individualistic entrepreneurs derive utility from social prestige, which may either be due to their more exposed position in society or due to producing above average quality products. Even under bad institutions, this non-monetary prestige effect cannot be expropriated by a predatory government. Collectivist countries, on the other hand should have an advantage in production processes, when they depend on collective actions.

Previous literature already provides support for these hypotheses, without explicitly distinguishing between the different explanations given above. Mueller and Thomas (2001) interviewed students in nine countries and show that individuals with innovative orientation are more frequently in highly individualistic and low uncertainty cultures. We confirm their finding with more extensive data and econometric methods. Using a comprehensive SEM, Williams and McGuire (2010) demonstrate that individualism has positive effects on creativity (measured as patents, publications and R&D spending) which in turn affects self employment and ultimately output per worker. Waarts and Van Everdingen (2005) add that not only entrepreneurs but also established firms differ in terms of technology adoption according to the national culture.

At least from a theoretical point of view Doepke and Zilibotti (2014) alert that the causal relation does not necessarily only run from culture to entrepreneurial activity. Their model yields a

bidirectional link between culture and economic growth that leads to multiple balanced growth paths. The number of entrepreneurs in a society depends on parental investments in children's patience and risk tolerance. Countries where people are more patient and risk tolerant exhibit more entrepreneurs and a higher growth rate. Parents' expected returns to entrepreneurship thus also endogenously drive the entrepreneurial spirit, i.e. culture of the future generation. Cautioned by their arguments, we rely on highly exogenous and consolidated instrumental variables in some of our estimations, following Gorodnichenko and Roland (2017) and others, reviewed in Nash and Patel (forthcoming).

In line with the theoretical model in Doepke and Zilibotti (2014), several authors find that (individualistic) culture affects other socioeconomic variables. Dheer (2017) provides evidence that individualism positively affects political freedom and education. Guiso *et al.* (2006) also suggest that there is a turning point in which schooling can have a negative effect on entrepreneurial activity as the individual has more choices in the job market than starting a business. These socioeconomic variables are consequentially included as controls in our regressions. In case of education quadratic terms are used. The empirical relationship between self-employment and fertility, does not seem to be obvious either, as positive (Broussard *et al.* 2015; Lin *et al.* 2000) and negative (Adsera 2004; Sena *et al.* 2012) correlations are observed. Simoes *et al.* (2016) argues that increased dedication towards each additional child and higher risk aversion are theoretical reasons to expect a negative relation. On the other hand, higher flexibility, concern and employment of teenage children are reasons for a positive correlation between fertility and self-employment.

Regarding the role of religion, Balog *et al.* (2014: 16) survey the literature and conclude that due to conflicting results, even on the general question whether religiosity does affect the behavior of entrepreneurs, "further research is necessary to untangle this relationship". In their view, entrepreneurship is based on values and it may therefore be affected by intrinsic and extrinsic religious orientation. Henley (2017), for example, finds a positive association between evangelical/Christian religious affiliation and entrepreneurial activity. Finally, religion may not directly affect entrepreneurial activity, but it may propagate cultural values that shape attitudes towards entrepreneurship (Dana 2009). In other words, culture and religion may be seen as either complements or competitive explanations for similar personal attributes. It is thus interesting to compare both types of variables side by side. Like Nikolaev *et al.* (2018), we prefer to include the shares of religious affiliation in each country as control variables.

It is still worth mentioning that a non-linear relation between unemployment on entrepreneurship is observed, for example, by Dvouletỳ (2018) and Fritsch *et al.* (2015). Their results indicate that an increase in unemployment at low levels drives some individuals to become entrepreneurs out of necessity. However, the non-linearity arises after a substantial increase in unemployment, like in an economic recession, turning the initial positive effect negative because the recession has adverse effects on the profitability of most entrepreneurs and self-employed in the economy.

Recent evidence shows that it is crucial to distinguish clearly between opportunity and necessity entrepreneurship. Using the total entrepreneurial activity (TEA) as dependent variable in cross-country studies can be misleading, since the TEA is negatively correlated with GDP and with

some of the institutional measures like economic freedom or the ease of doing business that the GEI takes into account (Acs *et al.* 2017). The reason for the counterintuitive observation is that countries with a low level of development tend to have low-quality institutions and despite the unfavorable environment for startups, the level of necessity entrepreneurship is high. Yet, this type of entrepreneurial activity contributes little to innovation and aggregate growth and thus explains the negative correlation between TEA and GDP. The data allow us to distinguish the two types of entrepreneurship, as well as between the aspirations and attitudes of entrepreneurs.

3 Empirical Strategy

In order to isolate the effect of individualism on the number of opportunity startups, it will be important to control for the potential confounding factors discussed in the previous section. By construction, the dependent variable (the number of opportunity startups) already accounts for institutional differences between countries, see section 4 for further details. This adjustment is important because it is possible that (part of) the effect of culture operates via institutional quality. Although the range of institutions that may possibly affect entrepreneurial activity is ample, further robustness checks mitigate the concern that the observed effect of individualism is spurious or biased. A linear specification of the model we have in mind is given by:

$$Y_i = \mathbf{X}_i\beta + \varepsilon_i = \beta_0 + \beta_1 IND_i + \mathbf{Z}_i\beta_z + \varepsilon_i \tag{1}$$

where i indexes countries, Y_i measures the number of opportunity startups in country i, IND_i measures the degree of individualism and ε_i is the error term. The $\mathbf{Z}_i$ vector includes controls for religious affiliation, the fertility rate, the unemployment rate, education and its square, the ease of doing business as the most important determinants, according to the literature on the macro determinants of entrepreneurship. The quadratic term of the unemployment rate turns out to be insignificant and thus does not appear in our estimations. Additionally, we include controls for networking and for the log of GDP per worker.[2]

A first problem in the estimation of eq. (1) is that the dependent variable (opportunity entrepreneurship) is given as a continuous index, which is limited to values between 0 and 1, i.e., a fractional variable. The predicted values from OLS regressions, however, are unbounded. Second, the relationship of any independent variable to a fractional outcome may not be linear through the full range of values (Ramalho *et al.* 2011). Hence constant marginal effects may be unreasonable. Third, fractional outcome variables are likely to have heteroskedastic distributions (Papke and Wooldridge 1996).

To avoid inaccurate predictions and biased coefficients that arise from the three issues above, we apply the Fractional Probit Regression Model (FPRM), a generalized linear model elaborated by Papke and Wooldridge (1996). Besides being a remedy to the three issues, the FPRM does

[2] As Nikolaev *et al.* (2018) mention, some studies include only the level of economic development as a control variable, while others add a rich set of controls, as in o ur case. In short, there is a remarkable heterogeneity in the choice of controls that make their way into estimations of entrepreneurship outcomes across countries. As a consequence of the lack of uniformity, we perform various estimations, adding the control variables subsequently.

not require any assumptions on the underlying data generation process to obtain the conditional distribution of Y_i. We could accommodate our model in a more common Logit or beta regression, but in cases where the index obtains its extreme values of zero or one and researchers want to retain such observations, neither a log-transformation nor a beta regression is appropriate, while the FPRM is (Rodriguez *et al.* 2018).[3] Following Papke and Wooldridge (1996), we assume that the conditional expectation of eq. (1) is given by

$$E(Y_i|\mathbf{X}_i) = \Phi(\mathbf{X}_i\beta) \tag{2}$$

where $\Phi(\cdot)$ is the cumulative standard normal distribution. Note that the main difference between the FRPM and the Probit model is that in the former the dependent variable can assume more than two values while still being bound between 0 and 1. The coefficients in this non-linear function are estimated from the following quasi maximum likelihood function

$$\ln L = \sum_i \left[Y_i \ln\left(\Phi(\mathbf{X}_i\beta)\right) + (1 - Y_i) \ln\left(1 - \Phi(\mathbf{X}_i\beta)\right)\right] \tag{3}$$

Provided that eq. (2) holds, the identified estimates $\hat{\beta}$ are consistent and $\sqrt{N}$-asymptotically normal regardless of the conditional distribution of the dependent variable. Like in the Probit model, the estimated coefficients $\hat{\beta}$ from eq. (3) cannot be readily interpreted as a result of the the model's non-linearity. Therefore, the tables in section 5 report average partial effects (APE) and standardized beta coefficients for the individualism variable to compare the estimates across samples and different dependent variables.[4]

Another possible threat to identification is that the effect of culture on entrepreneurship could be reciprocal. Think of a country with a large number of entrepreneurs where their risk-taking and independent spirit affects the attitudes of current employees and future workforce. Therefore, we combine the FPRM with instrumental variables for the individualism index to avoid the potential problem of reverse causality. Few papers previously combine the two estimation procedures.[5] Guiso *et al.* (2006) and several authors argue convincingly that genetic information (blood types and disease-causing pathogens) are highly exogenous and relevant to predict nations' degrees of individualism. According to the evaluation in Nash and Patel (forthcoming), these two variables are among the most convincing out of a large set of instruments that have been used for cultural dimensions in different contexts.

The first instrumental variable we apply for individualism is provided by Murray and Schaller (2010), who assemble the historical prevalence of nine different kinds of disease-causing pathogens. The authors observe a significant relation to the individualism-collectivism dimension even after controlling for a variety of other factors that may explain pathogen prevalence. The intuition behind this relation is that it is beneficiary for an ethnic group, that has a higher propensity of

[3] A Tobit model allows for a fractional distribution including its extreme values but it does not make much sense in the present case because the zeros and ones do not arise from censoring but rather from the normalization of the index. Moreover, the Tobit model requires several assumptions that do not apply to the present setting.

[4] To obtain the APE, one needs to calculate the marginal effects at each observation and then the average of these marginal effects. The corresponding heteroskedastic robust standard errors calculated by the delta-method.

[5] To have efficiency gains over the separate two-stage procedure, we apply the simultaneous estimation of the IV-FPRM according to Roodman (2011).

being infected by diseases, to avoid the contact with strangers who could bring infections into their stable environment. Consequently, such an ethnic group tends to live in isolation and their collective (within group) spirit is more pronounced, see also Fincher *et al.* (2008). Although individualistic people are more concerned with themselves, they tend to be more open towards strangers. The pathogen prevalence is thus inversely related with individualism. Because the pathogen prevalence is based on historical data, the risk of reverse causality is mitigated (Nash and Patel forthcoming). Murray and Schaller (2010) further note that correlation between GDP and cultural differences falls sharply once pathogen prevalence is controlled for. Therefore, Gorodnichenko and Roland (2017) stress that this genetic information plausibly affects income, innovativeness and other current economic variables only through the individualism channel.

Our second instrument is also based on genetic data and the arguments for its suitability are quite similar. Cavalli-Sforza *et al.* (1994) assemble data on genetic markers of ethnic groups in countries where the ethnic composition has largely been stable since the 16th century. Genetic and cultural proximity are highly correlated since both are transmitted within the family and both are highly persistent over time. Following Gorodnichenko and Roland (2017), we use the frequency of blood types, i.e., genetic markers that are not related to evolutionary fitness or any other characteristic that might influence the economic performance of individuals. The exclusion restriction is thus highly credible. In order to establish a connection to individualism, the Mahalanobis distance between the frequency of blood types in a given country and their frequency in the UK is calculated. The UK was chosen for being the most individualistic country in our sample and thus a lower blood distance indicates that the country is more individualistic.

Gorodnichenko and Roland (2017) use the same set of instruments to distinguish causal relations between individualism, innovation and economic growth. Besides the focus on entrepreneurship, our methodological approach is also different from theirs. Instead of two linear OLS regressions in the usual 2SLS estimation, our IV-FPRM model performs a two-step procedure with two fractional probit estimations. That means, the first stage estimation in our IV extension is also performed by a FPRM model because the endogenous variable (individualism) is measured as an index bounded between zero and one. In the usual manner, the predicted values from the first stage FPRM are used as a substitute for the endogenous individualism index in the second stage of the procedure.

4 Data

The dataset we assemble for the present study is composed of several sources. The most important data source is the Global Entrepreneurship Index (GEI) from 2017. It is an attempt to measuring the global entrepreneurial ecosystem performed and published by Acs *et al.* (2017). The 2017 version of the GEI goes far beyond calculating total entrepreneurial activity (TEA) and features some important refinements over its previous versions. The GEI is still built on the raw entrepreneurial data compiled by the surveys of the Global Entrepreneurship Monitor (GEM), but it incorporates several institutional factors and its division into sub-indices provides

further valuable information.[6] Instead of using the composite GEI, we select four of its pillars as alternative dependent variables.

(1) Number of Opportunity Startups: captures how many startups are created by individuals who are looking for good opportunities, satisfaction of personal aims, in contrast to those created by people who lack other employment opportunities. This index accounts for the effect of taxation and quality of government services. (2) Opportunity Perception: measures the percentage of individuals that *perceive* good entrepreneurial opportunities in their vicinity adjusting for the size of the market as well as the country's economic freedom, regulatory burden and property rights. (3) Product Innovation: measures a country's potential to create new products and to adopt or imitate existing products considering technology and innovation transfer in the country's business environment. (4) Process Innovation: captures how many new business use or create technology that is less than five years old. This sub-index is adjusted for the country's R&D efforts and scientific infrastructure.

We use the opportunity startup index as our preferred dependent variable because it reflects the number of startups that were de facto created, and because it is a direct measure for the deliberate part of total entrepreneurial activity. For both reasons, the number of opportunity startup has direct implications on growth and GDP. Moreover, since the index, by definition, refers to the satisfaction of personal aims, we expect that it should show a clear relation to the individualism vs. collectivism dimension of culture.

The second most important data source is the six dimensional model of national culture developed by Geert Hofstede. Based on a series of cross-country surveys, Hofstede *et al.* (2010) identify six basic dimensions that distinguish national cultures. This data set is rarely updated because cultural values are highly persistent and thus, according to the authors, similar to climate data. Individualism can be defined as a preference for a weak social framework in which individuals are expected to take care of themselves primarily. Individualistic people value freedom and personal fulfillment and attribute social prestige to individual achievements (Kyriacou 2016). Its opposite, collectivism, represents a preference for a conformist, well-defined structure in society in which individuals can expect their relatives or members of a group to care for them in exchange for unquestioning loyalty (Hofstede *et al.* 2010). We agree with Gorodnichenko and Roland (2017), who stress that individualism should not be understood as a superior cultural form in any sense. Collectivism has different advantages, as it, for example, seems to favor static efficiency, while individualism promotes dynamic efficiency, change and is hence more propitious for entrepreneurs. The other Hofstede cultural dimensions, power distance, masculinity, uncertainty avoidance, long-term orientation and indulgence are used for robustness checks. We normalized these culture indices to range from 0 to 1. Figure A.1 in the Appendix shows the substantial variation of the opportunity entrepreneurship index across the globe.

[6] The GEI is the first complex index to focus on multidimensional quality and not on the quantitative aspects of entrepreneurship. To reflect the interdependent nature of the indicators, the GEI is based on a "penalty for bottleneck" (PFB) methodology, whose central principle is that system performance depends on the weakest link. Higher punctuation indicators may not have their full effect on system performance because of the bottleneck. The uniqueness of this methodology is that the elements of the system are only partially substitutable for each other. The GEI is composed of three subscripts: Attitudes, Abilities and Aspiration and each subscript has its corresponding pillars. Opportunity perception and the number of opportunity startups are one of those pillars.

The remaining control variables stem from standard data sources such as the World Bank or Penn World Tables that deserve few further comments. The instrumental variables we use for the individualism index are described in the previous section. Appendix table A.1 provides an overview of the descriptions and sources of the variables used in this study. Table A.2 shows the respective summary statistics and table A.3 lists all of the 69 countries with complete data used in the present analysis.

5 Results

5.1 Baseline results

Table 1 presents the FPRM estimation results. In the basic specification in column (1), the dependent variable is the opportunity startup index and Hofstede's individualism index is the only explanatory variable. According to the previous theoretical considerations, the coefficient of individualism is positive and significant. The (standardized) beta coefficient in the first column indicates that an increase in the degree of individualism by one standard deviation would foster the number of opportunity startups by 0.68 standard deviations.

Table 1: Baseline fractional probit regressions

	(1)	(2)	(3)	(4)	(5)
	dep. var.: opportunity startup index				
individualism	0.785***	0.618***	0.562***	0.531***	0.327***
	(0.078)	(0.111)	(0.104)	(0.120)	(0.087)
fertility rate		-0.059***	-0.045**	-0.070***	0.022
		(0.020)	(0.018)	(0.020)	(0.027)
unemployment rate		-0.011***	-0.013***	-0.011***	-0.009***
		(0.003)	(0.004)	(0.004)	(0.003)
years of schooling		0.015	0.009	0.019*	0.011
		(0.011)	(0.011)	(0.010)	(0.010)
ease of doing business			0.722***	0.735***	0.721***
			(0.252)	(0.244)	(0.169)
networking					0.356***
					(0.082)
log GDP per worker					0.119***
					(0.027)
religion controls	✗	✗	✗	✓	✓
Observations	69	69	69	69	69
Chi-squared	58.42	89.28	110.5	161.9	305.3
LL	-42.05	-40.94	-40.49	-39.49	-37.82
AIC	88.10	93.90	95	107	107.6
individualism (beta)	0.677	0.533	0.485	0.458	0.282

Notes: The table shows average marginal effects and its robust standard errors in parentheses. The individualism index is that of Hofstede *et al.* (2010). The last two regressions include the percentages of population practicing the main religions (Protestants, Catholics, Jews, Muslims, Buddhists, Hindus and Atheists) in a country.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Once we include control variables for differences in unemployment, education, fertility rate, religion and the ease of doing business across countries, the strength of the effect of individualism is gradually reduced to a still significant beta coefficient of 0.46. The control variables' coefficients

have the expected sign and except for the education level, are significant at the 1% level. The negative coefficient of the fertility rate is a sign that opportunity entrepreneurs dedicate a significant part of their time to their business and face the need to cut their own time for childcare, in line with Adsera (2004), among others. One may thus suspect that previously observed positive correlations between fertility rates and entrepreneurship are driven by necessity self-employment, which should be more important in countries with an expressive population growth and a lack of employment opportunities in the formal labor market.

Although the dependent variable already captures opportunity startups net of the effect of taxation and quality of government services, the variable ease of doing business still shows a positive and highly significant coefficient. In line with the majority of studies, see Aparicio *et al.* (2016) for example, this observation emphasizes the role of institutional quality in stimulating a country's business environment. Moreover, we observe that the unemployment rate is slightly lower in countries with more entrepreneurs that create their business out of opportunity. Including religious beliefs increases the model's goodness of fit but in the presence of the previous control variables, the distribution of religious adherents across countries does not change the coefficient of individualism much.

The regression in the last column additionally includes networking abilities and overall wealth, as measured by GDP per worker. Both variables seems to facilitate the realization of entrepreneurial opportunities. The goodness of fit statistics in the lower part of table 1 indicate that networking abilities and GDP are also of major importance for businessmen. The reduction of the effect of individualism suggests that networking and GDP are considerably affected by the cultural dimension and transmit some of its impact on opportunity entrepreneurship. The complete model in column (5) finally shows a significant beta coefficient of individualism equal to 0.28 corresponding to a reduction of 58% compared to the univariate regression in the first column.

As explained in section 4, the networking variable is a part of the GEI in 2017 and reflects how *potential* entrepreneurs are connected to other entrepreneurs given the country's degree of urbanization and infrastructure. Despite the consideration of entrepreneurs and non-entrepreneurs, the index is obviously influenced by the number of (opportunity) entrepreneurs in the country. The higher number of opportunity startups may also affect the unemployment rate, fertility rate and GDP level. It is thus implausible to argue that all variables in our model are strictly exogenous. A dominant influence of the entrepreneurial spirit may even contribute to a generally more individualistic and liberal orientation in the country. Therefore, we suspect that our cultural variable may be endogenous in the previous estimations.

In order to avoid the threat to identification through reverse causality, we proceed with the IV-FPRM estimations. Moreover, the previous estimations could still suffer from omitted variable bias if there are unobserved factors/shocks that are correlated with both individualism and entrepreneurship. It is virtually impossible that entrepreneurial opportunities either today or in the past could have affected the prevalence of infectious diseases or the frequency of blood types that different ethnicities present. Unbiased instrumental variable regressions also require that all right-hand-side variables but the instrumented variable are exogenous. This is not the

case in the present setting and it is very hard to find credible instruments for all of the variables in table 1. Gorodnichenko and Roland (2017) demonstrate that the presence of endogenous variables which are positively correlated with individualism (which applies ot the majority of variables in their and our case), the coefficients for individualism from the IV estimation are lower bound estimates, i.e., if we had suitable instruments for all endogenous variables, the true effect of culture would even be larger and more significant.

Table 2 presents the IV-FPRM estimations using only one of the instruments at a time and then both. Each of these three combinations is performed with and without the full set of control variables from the previous table 1. The statistics from the first stage FPRM at the bottom of table 2 confirm that both the blood distance and the pathogen prevalence are highly relevant predictors for the degree of individualism across countries. According to the chi-squared and the log likelihood statistic, the estimation in the last column with both instruments and the full set of control variables provides the best fit. In this regression, both instruments are significant at the 1% level. In line with Murray and Schaller (2010), the relation between individualism and pathogen prevalence is negative, just like countries' blood distance to the most individualistic country, the UK.

Table 2: Instrumental Variable FPRM

	(1)	(2)	(3)	(4)	(5)	(6)
	Second stage results: dep. var.: opportunity startup index					
individualism	0.786***	0.329***	0.799***	0.331***	0.795***	0.332***
	(0.078)	(0.088)	(0.076)	(0.088)	(0.077)	(0.087)
controls	✗	✓	✗	✓	✗	✓
Observations	69	69	69	69	69	69
Chi-squared	81.83	805.1	132.5	693.4	142.8	882.4
LL	-86.33	-78.91	-85.13	-78.93	-84.57	-78.66
AIC	182.7	223.8	180.3	223.9	181.1	225.3
individualism (beta)	0.677	0.284	0.689	0.285	0.685	0.286
	First stage results: dep. var.: individualism					
blood distance	-0.158***	-0.077**			-0.083***	-0.078**
	(0.025)	(0.033)			(0.027)	(0.033)
pathogen prevalence			-0.239***	-0.106**	-0.183***	-0.107**
			(0.023)	(0.052)	(0.028)	(0.047)
controls	✗	✓	✗	✓	✗	✓
Chi-squared	32.88	326.3	77.20	244.5	80.81	356.7
LL	-44.27	-41.09	-43.13	-41.10	-42.54	-40.83

Notes: The table shows average marginal effects and its robust standard errors in parentheses. The lower part of the table shows results from the first stage regression where the index of individualism is instrumented by the Mahalanobis blood distance between each country and the UK and/or the average of nine pathogenic genes. The table also indicates whether the estimations include the full set of control variables (as in column 5, table 1). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In sum, the identified effect of individualism in the IV-FPRM estimations practically does not depend on which of the instruments is used. Nor do the coefficients differ much from the previous FPRM estimations without instrumenting for individualism. Without the full set of control variables, the estimated effect of individualism is more than twice as high. These two sets of results corroborate that individualistic countries generate more opportunity startups. The beta coefficient of 0.29 means that one standard deviation change in the individualism

index (equal to 0.24) would, on average, improve the entrepreneurial opportunity index by 0.07. For example, this cultural difference corresponds to the one between UK and South Africa or between Ireland and Morocco while the difference in the opportunity startups is equal to the one between USA (0.77) and Taiwan (0.70) or between Pakistan (0.11) and Argentina (0.18).

For comparison, appendix table A.4 provides the results from the more common OLS and efficient two-step IV-GMM estimations. The difference between the marginal effects of individualism in the baseline FPRM and the OLS estimation in table 1 is minor. Explicitly treating the opportunity startup index as a fractional variable thus does not make much difference for our main result. The outcomes in the IV-FPRM and the linear IV-GMM estimations however, are unequal. In the preferred estimation with control variables, the IV-GMM model overestimates the effect of individualism by 50%. Since the difference between the estimations with the opportunity startup index as dependent variable is small, the divergence in the IV estimations arises from the first stage estimation. Hofstede's individualism index thus seems to be a fractional variable that actually requires the correction through the FPRM.

A desirable side effect of the IV-GMM estimations in table A.4 is that we can perform a well-known test for the statistical exogeneity of our IVs.[7] In line with our previous arguments about the importance of institutions and other confounding factors, Hansen's overidentification test clearly rejects the endogeneity of blood distance and pathogen prevalence, once these cross-country differences are accounted for. The Anderson-Rubin and Stock-Wright tests (in their robust version) clearly reject the Null hypothesis of weak instruments.

5.2 Analyzing the transmission channel of individualism

The present subsection has two purposes. In the first place, we analyze whether the individualism-collectivism dimension of culture also affects other economic phenomena that are closely related to the number of opportunity entrepreneurs in a country. The literature discussion in section 2 indicates that individualistic countries tend to be more innovative and have higher facility to contribute to or adopt the latest technology. Another hypothesis is that individualistic people derive more utility from their position as an entrepreneur in society. An additional increase in utility from the realization of the personal desire to become an entrepreneur should thus alter potential entrepreneurs' assessment of the business environment. The attitude towards individualism-collectivism may thus be decisive for persons who are at the margin of judging an opportunity as good or not good. Specifically, we use three different indices from the 2017 GEI as independent variables: product innovation, process innovation and opportunity perception.

Table 3 shows that the impact of individualism on the opportunity perception and on the process innovation index is significant and positive. The estimations reconfirm that once the cross-country differences in education, wealth, institutions, religion etc. are accounted for, the FPRM and the IV-FPRM yield quantitatively similar estimates for individualism. To save space we only report the IV-FPRM results in table 3. No significant relation could be established to product innovation index, however. How can the difference between product and process innovations

[7] Note that Hansen's overidentification test is only defined for linear models and unfortunately has no counterpart for the IV-FPRM.

be explained? The main reason for the lack of significance in the regressions on the product innovation index is the inclusion of GDP per capita. This variable is clearly endogenous and, in the absence of an suitable IV, it may bias the estimates downward, as argued before. At least we can confirm with enough statistical confidence that entrepreneurs in individualistic countries intrinsically evaluate opportunities to become self-employed as more favorable and they tend to rely more on the latest technology.

Table 3: IV-FPRM – Alternative effects of individualism

	(1)	(2)	(3)
dep. var.:	process innov.	product innov.	opp. perception
individualism	0.330**	0.260	0.257*
	(0.167)	(0.193)	(0.132)
controls	✓	✓	✓
Observations	69	69	69
Chi-squared	977.1	989.3	1147
LL	-81.60	-82.24	-80.44
AIC	231.2	232.5	228.9
individualism (beta)	0.291	0.217	0.228

Notes: The table shows average marginal effects and its robust standard errors in parentheses. The dependent variable is either the process innovation index, the product innovation index or the opportunity perception index. Individualism is instrumented by the blood distance and the pathogen prevalence. Control variables are the same as in column 5, table 1.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

An interesting difference between the opportunity perception and the opportunity startup index is that the latter refers to the number of people who actually decided to become an entrepreneur, while the former is based on the response of potential entrepreneurs. The opportunity perception index thus represents the entire population, whereas the opportunity startup index is based on a subsample where selection into entrepreneurship may be an issue. This selection bias may be responsible for the slightly lower point estimate and significance of the results from the perceptions compared to the startup index. Nevertheless, the close resemblance of the results corroborate our main conclusions thus far. We still prefer to use the opportunity startup index as the main independent variable of interest because it is directly related to the real economy and not only to pretensions and perceptions. Moreover, it includes the satisfaction of personal aims, which we hypothesized to be closely related to individualism, and it comprises the three dimensions analyzed in table 3 as the next extension will show.

The significant relations between individualism and the GEI sub-indices in table 3 cast doubt on the interpretation of our model for the explication of the number of opportunity startups in eq. (1) and tables 1 and 2. Firstly, higher process or product innovation potential should provide a competitive edge for entrepreneurs in individualistic countries. Secondly, higher opportunity startup rates may also be explained by a more optimistic assessment of opportunities themselves. Acs *et al.* (2008) previously pointed to the interrelations of these variables and that it would be highly interesting to disentangle their effects. The questions that arise in the present context are: (1) Is there really a direct effect of individualism on the number of opportunity startups? (2) Do the opportunity perception and the innovation potential act as transmission channels for the relation between individualism and startup rates?

Table 4: Individualism vs. opportunity perception and innovation potential

	(1)	(2)	(3)	(4)	(5)
	dep. var.: opportunity startup index				
individualism	0.259***	0.286***	0.257***	0.187**	
	(0.083)	(0.091)	(0.090)	(0.076)	
opportunity perception	0.287***			0.281***	1.034***
	(0.082)			(0.078)	(0.280)
product innovation		0.125**		0.028	0.125
		(0.061)		(0.062)	(0.208)
process innovation			0.204***	0.187**	0.733***
			(0.070)	(0.075)	(0.260)
controls	✓	✓	✓	✓	✓
Observations	69	69	69	69	69
Chi-squared	343	296.9	305.4	356.3	318.1
LL	-37.51	-37.71	-37.63	-37.31	-37.42
AIC	109	109.4	109.3	112.6	110.8
individualism (beta)	0.223	0.246	0.221	0.161	

Notes: The table shows average marginal effects and its robust standard errors in parentheses. Estimations include the full set of control variables (as in column 5, table 1). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The estimations in table 4 explore how much of the direct effect of individualism on the opportunity startup index remains when we include the three other GEI sub-indices into the FPRM.[8] Columns (1) to (3) show that opportunity perception as well as process and product innovation potential are relevant transmission channels of individualism on the opportunity startup rate. Each of the three variables is significantly related to the number of startups and reduces the effect of individualism by about 22%. The combination of the three variables in column (4) shows that these transmission channels account for 43% of the individualism effect. Hence the remaining 57%, i.e., the beta coefficient of 0.16 represents the direct effect of individualistic culture on the number of opportunity startups. The perception of opportunities and the adoption to new technology seem to be more relevant than the country's potential to create new products, in line with table 3. The last column of table 4 shows how the fit of the previous estimation deteriorates and how the point estimates of opportunity perception and innovation potential would be overestimated without the explicit consideration of individualism, which seems to be one of the true drivers of the four Global Entrepreneurship sub-indices.

5.3 Robustness

This subsection briefly presents three more extensions that critically evaluate our main results. First, we include more control variables for institutions and then consecutively exclude groups of countries. As both robustness checks decrease the number of observations and degrees of freedom, we do not combine them. Finally, individualism is substituted for other cultural dimensions.

Despite our previous efforts to account for differences in institutions, it is hardly possible to

[8] Note that we do not use the IV-FPRM for the differentiation between the transmission channel of culture because the previous results in the FPRM and IV-FPRM were highly similar, and because the additional inclusion of three endogenous variables would certainly magnify an existing downward bias in the individualism estimates.

capture all dimensions of institutions. Based on previous findings, we argued that individualism has positively affected the quality of institutions. In order to minimize any remaining omitted variable bias in our individualism estimates, columns (1) to (3) in table 5 make further efforts in this direction. Column (1) includes the risk of expropriation index in our baseline regression (column 5, table 1. The risk of expropriation is a major threat to any enterprise and the index combines various associated factors and is frequently used, for example in Acemoglu *et al.* (2002). The same authors also show that the quality of current institutions was determined to a large extent by European colonization. In particular, in former settlement colonies, with a high share of Europeans (in 1900), institutions tend to work more efficient than in the so called explorations colonies, where Europeans took control of the government but without the subsequent mass immigration. By the same reasoning, climate conditions affected the migrations flows over the last two centuries. Moreover, a more suitable climate for agriculture was another important factor for the accumulation of wealth and the development of good institutions. Both variables are subsequently added to the estimations in column (2) and (3), but turn out to be of minor importance in the presence of the expropriation risk index. Despite the reduction to a beta coefficient of 0.2, individualism remains highly significantly determinant for the number of opportunity startups.

Table 5: FPRM – sub-samples and more control variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
sample:		full sample		no EUR	no LA	no AFR	no ROW
individualism	0.333***	0.324***	0.239**	0.475***	0.211*	0.239**	0.263***
	(0.074)	(0.076)	(0.104)	(0.163)	(0.117)	(0.104)	(0.098)
Expropriation risk	0.026***	0.026***	0.024***				
	(0.006)	(0.006)	(0.006)				
Europeans in 1900		-0.046	-0.036				
		(0.049)	(0.047)				
climate suitability			0.040				
			(0.032)				
controls	✓	✓	✓	✓	✓	✓	✓
Observations	52	52	52	37	55	61	54
Chi-squared	392.9	398.9	395	122.5	339.4	330	466.5
LL	-28.38	-28.36	-28.32	-20.88	-29.90	-33.15	-28.57
AIC	90.80	92.70	94.60	73.80	91.80	98.30	89.10
individualism (beta)	0.287	0.279	0.206	0.455	0.177	0.209	0.216

Notes: The table shows average marginal effects and its robust standard errors in parentheses. Individualism is instrumented by blood distance pathogen prevalence. Control variables are the same as in column 5, table 1. Regressions in columns (4) and (7) exclude Europe, Latin and Central America, Africa and the rest of the world, respectively. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Columns (4) to (7) in table 5 repeat the baseline estimation, excluding either countries in Europe, Latin and Central America, Africa and the remaining countries in the sample. The intuition of this exercise is to see whether a specific group of similar countries is driving our results (for whatever reason). The only noticeable difference between the individualism estimates is a higher coefficient in the sample without Europe. A possible explanation is that much of the entrepreneurial differences between European countries seems to be beyond the cultural explanation. European countries are geographically close and its cultural variation is also lower than in any of the other country groups, see figure A.1.

Finally, one might argue that not individualism in particular but rather cultural differences in general are responsible for the observed variation in the number of opportunity startups across the globe. To test this hypothesis, we substitute individualism in the IV-FPRM for one of the five other cultural dimensions in Hofstede *et al.* (2010): power distance, masculinity, uncertainty avoidance, long term orientation and indulgence. The results in appendix table A.5 confirm our previous arguments in favor of individualism. (1) Only in two of the ten first stage coefficients do we observe statistical significance. Where one of the instruments, blood distance and pathogen prevalence is significantly related to the cultural dimension, the other IV is not. This weakens the causal interpretation of the results and is not in line with our explanation for the origins of cultural differences. (2) Only power distance is significantly related with opportunity entrepreneurship and with one of the instruments. Gorodnichenko and Roland (2011) also find that individualism has the most robust impact on economic growth while power distance is strongly correlated with individualism and captures similar values. (3) The economic argument also seems less convincing for power distance. Would someone perceive opportunities as more favorable, be more innovative and finally take a good opportunity to start a business because he/she is a less powerful member of society and has a lower acceptance of unequal power distribution?

6 Conclusion

The present paper provides strong and robust evidence that living in an individualistic culture can positively affect opportunity entrepreneurship, accounting for reverse causality using highly exogenous instruments based on genetic data and the Fractional Probit Regression Model in order to correct for the fact that both individualism and entrepreneurship are indices. Our preferred estimation indicates that a potential increase in individualism by one standard deviation would bring a country like Chile halfway to the level of the US, which corresponds to an increase of 0.2 standard deviations in the opportunity startup index. Confounding factors, especially institutional differences, were controlled for as good as possible in a cross-section estimation considering that the cultural dimension lacks variation over time. The effects of individualism are also independent from the potential effects of religion. Thanks to the disaggregation of entrepreneurial activity in the latest version of the GEI provided by Acs *et al.* (2017), we could show that more individualistic countries tend to have a more optimistic perception of opportunities and a higher innovation potential. The combination of these indirect effects explains about half of the total effect of individualism on the number of opportunity startups can be explained.

The difference between the estimations with and without instrumental variables suggests that reverse causality is not a major problem in the present setting. This finding is in line with the view that cultural traits are highly persistent and inherited from generation to generation (Spolaore and Wacziarg 2013). On the other hand, using the traditional OLS or 2SLS estimations, without correction for fractional variables, produces two times larger marginal effects. The first stage regressions, where the individualism index is instrumented by genetic information, are mainly responsible for the divergent results. This insight about the IV-FRPM is valuable for

a broader audience since the application of cultural variables and its instrumentation has been used in many areas, see for example Nash and Patel (forthcoming) for a review with focus on the Finance literature.

We emphasize that culture should not be understood as a policy variable or as something that is adequate for deliberate changes. Nevertheless, there are some practical implications of our results. Improving a country's innovation potential, be it regarding new products, processes or the adoption of new technologies, is the most obvious and commonly understood way to increase high-quality entrepreneurship. Although our data and analysis are country-specific, not all individuals share the same attitudes and abilities. Individualism can thus be understood as a more general characteristic of entrepreneurs, like the networking ability, or risk taking behavior. One need to remember that the hypothesized connection between individualism and entrepreneurship is via self-realization and recognition of personal achievements in society. The latter can be modified by the public policies. Finally, our results also stress that the perception of opportunities is an important determinant of entrepreneurial activity. This notion opens space for public intervention, for example, in favor of training, legal support, exchange of experience between entrepreneurs, etc. so that the perception of good opportunities may be facilitated.

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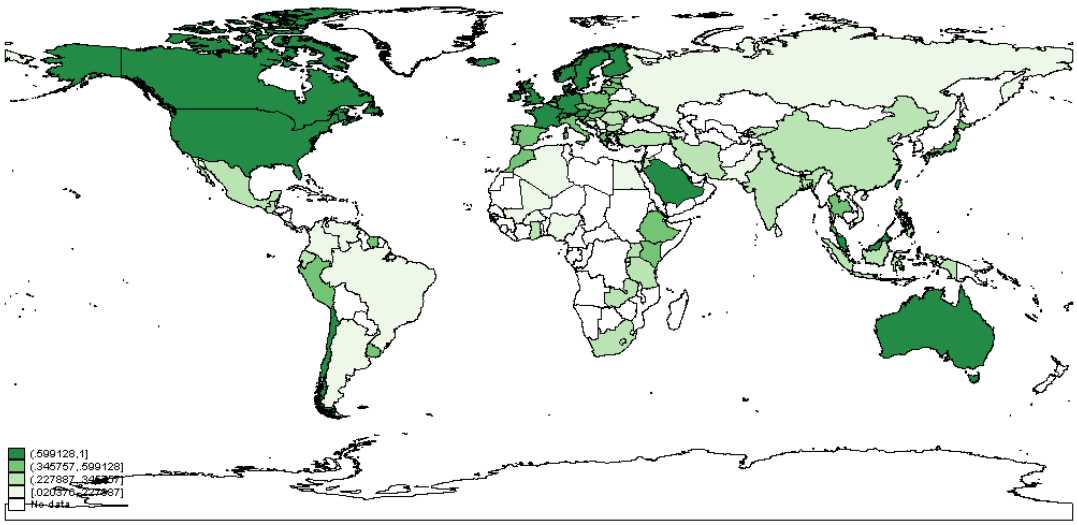
A Appendix – additional figures and tables

Figure A.1: Spatial Distribution of Opportunity to Start a Business



Notes: The graph displays how the GEI 2017 index of Opportunity to Start a Business is distributed across countries. A higher index value corresponds to a higher level of entrepreneurship.

Table A.1: Description of Variables

Variable	Description	Source and year
Opportunity Perception	Perception of good opportunities to start a business considering market potential, economic freedom and property rights.	GEI 2017
Opportunity Startups	Created startups due to good opportunities and personal aims, considering government service quality and taxation.	GEI 2017
Product Innovation	A country's potential to create new products or adopt existing products, considering technological and innovative environment.	GEI 2017
Process Innovation	How many new business use or create new technology, considering R&D efforts and the scientific infrastructure.	GEI 2017
Networking Index	Considers the potential and active ability to access people.	GEI 2017
Individualism	Individualism vs. collectivism cultural dimension	Hofstede *et al.* (2010)
Power Distance	How less powerful members accept unequal power distribution.	Hofstede *et al.* (2010)
Masculinity	Index that reflects dominance of men over women.	Hofstede *et al.* (2010)
Uncertainty avoidance	Reflects a society's tolerance for uncertainty.	Hofstede *et al.* (2010)
Long term orientation	Extent to which a society maintains links with its own past.	Hofstede *et al.* (2010)
Indulgence	Measures the degree to which societies allow joy over duty.	Hofstede *et al.* (2010)
Fertility rate	The ratio of live births over the population.	World Bank, 2016
Years of schooling	The average number of years of studies.	World Bank, 2016
Log(GDP per worker)	Log gross domestic product per worker in US $.	Penn World Tables, 2000
Ease of doing business	Index that measures the number of procedures,time, cost, etc. for a SME to start and formally operate in the market.	Doing Business 2017
Unemployment	Percentage of unemployment	Heritage foundation, 2017
Protestants	The percentage of adherents of Protestantism.	ARDA, 2010
Catholics	The percentage of adherents of Catholicism.	ARDA, 2010
Jews	We consider the percentage of adherents of Judaism.	ARDA, 2010
Muslims	We consider the percentage of adherents of Islam.	ARDA, 2010
Buddhists	The percentage of adherents of Buddhism.	ARDA, 2010
Hindus	The percentage of adherents of Hinduism.	ARDA, 2010
Atheists	The percentage of adherents of no religion.	ARDA, 2010
Pathogen prevalence	Average of nine epidemiological data on pathogen prevalence.	Murray and Schaller (2010)
Blood distance	Mahalanobis distance between the frequency of blood types in a given country and the frequency of blood types in the UK.	Cavalli-Sfoza, Menozzi,Piazza(1994)
Europeans in 1900	Share of descendants of European colonizers in 1900.	Putterman and Weil (2010)
Expropriation risk	Index for the risk of expropriation.	ICRG, 2017
Climate suitability	Suitability of climate conditions for agriculture.	Olsson and Hibbs Jr (2005)

Table A.2: Summary Statistics

	mean	sd	min.	max.	obs.
opportunity startups	0.46	0.27	0.02	1	69
opportunity perception	0.46	0.27	0.05	1	69
product innovation	0.46	0.28	0.03	1	69
process innovation	0.46	0.27	0.03	1	69
networking	0.41	0.19	0.04	0.99	69
individualism	0.42	0.24	0.06	0.91	69
power distance	0.59	0.21	0.11	1	58
masculinity	0.48	0.2	0.05	1	58
uncertainty avoidance	0.68	0.22	0.13	1	58
long term orientation	0.46	0.23	0.04	1	65
indulgence	0.47	0.24	0	1	65
fertility rate	2.12	0.96	1.23	5.59	69
years of schooling	9.55	3	1	13	69
log GDP per worker	9.82	0.96	7.37	11.65	69
ease of doing business	0.86	0.1	0.33	0.98	69
unemployment rate	8.19	4.89	1.1	25.1	69
protestant share	0.15	0.2	0	0.81	69
catholic share	0.36	0.33	0	0.88	69
jewish share	0	0	0	0.02	69
muslim share	0.16	0.3	0	0.99	69
buddhist share	0.02	0.11	0	0.87	69
hindu share	0.02	0.1	0	0.8	69
without religion	0.13	0.14	0	0.76	69
blood distance from UK	1.44	0.86	0	3.34	69
pathogen prevalence	-0.11	0.66	-1.31	1.16	69
Europeans in 1900	0.31	0.38	0	0.99	68
Expropriation risk	35.27	4.56	24.36	44.96	68
Climate suitability	2.06	0.95	0	3	53

Table A.3: List of the 69 nations included in this study

Albania	Croatia	Guatemala	Netherlands	South Africa
Argentina	Czech Rep	Hungary	Nigeria	Spain
Australia	Denmark	India	Norway	Sweden
Austria	Dominican Rep	Indonesia	Pakistan	Switzerland
Bangladesh	Ecuador	Ireland	Peru	Tanzania
Belgium	Egypt	Italy	Philippines	Thailand
Brazil	El Salvador	Jamaica	Poland	Trinidad And
Bulgaria	Estonia	Korea South	Portugal	Turkey
Burkina Faso	Finland	Latvia	Romania	U.S.A.
Canada	France	Lithuania	Russia	Ukraine
Chile	Germany	Luxembourg	Saudi Arabia	Uruguay
China	Ghana	Malaysia	Serbia	Venezuela
Colombia	Great Britain	Mexico	Slovak Rep	Zambia
Costa Rica	Greece	Morocco	Slovenia	

Table A.4: Common OLS and IV estimations

	(1)	(2)	(3)	(4)
estimation:	OLS	OLS	IV-GMM	IV-GMM
individualism	0.834***	0.346***	1.027***	0.516***
	(0.094)	(0.104)	(0.122)	(0.200)
controls	✗	✓	✗	✓
Observations	69	69	69	69
R-squared	0.520	0.852	0.492	0.845
individualism (beta)	0.719	0.298	0.885	0.445
Hanson J			2.815	0.654
Hanson J-p			0.0934	0.419
1.stage R2-part.			0.546	0.195

Notes: The table shows common marginal effects and its robust standard errors in parentheses. The dependent variable is the opportunity startup index. The statistics in the last four columns refer to the first stage regressions where the index of individualism is instrumented by the blood distance between each country and the UK and the pathogen prevalence. The table also indicates whether the estimations include the full set of control variables (as in column 5, table 1).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Estimations with different cultural dimensions

	(1)	(2)	(3)	(4)	(5)
Culture dimension:	PD	Mas	UA	LTO	IDG
IV-FPRM – second stage results					
culture	-0.310***	-0.028	-0.396***	-0.052	-0.075
	(0.103)	(0.082)	(0.092)	(0.099)	(0.117)
controls	✓	✓	✓	✓	✓
Observations	54	54	54	54	54
Chi-squared	1269	685.1	755.5	665.9	802
LL	-62.39	-65.06	-59.62	-63.89	-63.57
AIC	192.8	198.1	187.2	195.8	195.1
individualism (beta)	-0.234	-0.0200	-0.296	-0.0420	-0.0620
IV-FPRM – first stage results					
blood distance	0.024**	0.020	0.007	0.011	-0.021
	(0.011)	(0.016)	(0.012)	(0.015)	(0.016)
pathogens	0.017	0.005	-0.010	-0.050***	0.031
	(0.015)	(0.020)	(0.016)	(0.019)	(0.020)
controls	✓	✓	✓	✓	✓
Chi-squared	60.78	27.33	43.95	42	43.37
LL	38.45	24.02	30.61	26.04	24.73

Notes: The top of the table indicates which of Hofstede's other five cultural dimensions is analyzed in the respective regressions: PD = power distance index, Mas = Masculinity index, UA = uncertainty avoidance index, LTO = long term orientation index, IDG = indulgence index. The table shows average marginal effects and robust standard errors in parentheses. The dependent variable in the second stage regression is the index of the opportunity to start a business. All regressions also include the full set of control variables.