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RESEARCH ARTICLE

The role of culture as an informal institution in cross-border venture capital investments

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Abstract

Grounded in Hofstede cultural dimensions theory, we examine how informal institutional factors shape cross-country venture capital (VC) flows. Separating VC activity into flows, our method studies how an increment in inflows supports ventures, and an increment in outflows more investing activity. Results suggest that (1) uncertainty avoidance negatively affects investors and ventures (the last with a larger effect), (2) individualistic attitudes equally support both investors and ventures, and (3) a higher level of power distance contributes to a larger private investors sector, an effect that is greater under strong formal institutions (FIs). Effects of masculinity, long-term orientation, and indulgence are inconclusive. Results are robust to various specifications, use of instruments, and endogeneity treatments. The implication is that the optimal characteristics of informal institutions for fostering VC activity differ depending on the level of FIs, as both institutions interact to affect both investors and ventures.

Keywords: culture; entrepreneurship; Hofstede; institutions; venture capital

Introduction

Over the last few decades, there has been a worldwide increase in venture capital (VC) activity, even in regions such as Latin America (LAVCA, 2021) and Africa (Partech, 2020), where it was previously limited (Chemmanur *et al.*, 2016). This enhanced access to funding fosters entrepreneurship, thereby fuelling economic growth at the micro (Puri and Zarutskie, 2012) and macro (Samila and Sorenson, 2011) levels. However, disparities persist among countries in attracting capital investment, particularly in developing regions (Nabisaalu and Bylund, 2021; World Bank, 2020). Understanding these gaps is crucial for policymakers aiming to promote VC markets.

Although prior research has traditionally treated VC activity as a single entity, there is a pressing need to dissect it further. Such a myopic approach overlooks potential differences in responses from investors and ventures across various institutional settings or local/foreign sources of capital (Grilli *et al.*, 2019: 1111). By neglecting these distinctions, our ability to fully grasp the impact of specific institutional mechanisms is compromised (Cumming *et al.*, 2016b). Moreover, with VC's increasing internationalization playing a significant role in firm value creation, examining the transborder context offers a more comprehensive understanding of VC investments. By integrating North's (1990) institutional framework and Hofstede *et al.*'s (1990) cultural dimensions, we aim to provide a nuanced analysis of how informal institutions influence cross-border VC flows. This approach calls for heightened analytical rigour in entrepreneurship studies (Stewart, 2022) and more nuanced analysis of institutional contexts (Audretsch *et al.*, 2022).

Institutionalism provides a comprehensive lens for understanding the complex mechanisms from which institutions can shape entrepreneurial activity and economic impact (Baumol, 2009). Although much attention has been given to the role of formal institutions (FIs) in fostering VC activity, there is a growing critique of the neglect of informal institutions (Boddewyn and Peng, 2021; Bustamante *et al.*, 2021; Grilli *et al.*, 2019). Culture, as a significant information institution, shapes behaviours and attitudes beyond purely economic considerations, as it interacts with other factors such as ethics, rhetoric, and ideologies (Kaasa and Andriani, 2022; McCloskey and Silvestri, 2021). Therefore, when examining how cultural values influence entrepreneurship (Mickiewicz and Kaasa, 2022), it is essential to delve beyond surface measurements and consider the complexities of the phenomenon.

We model VC markets as a two-country supply and demand model, with investors as suppliers of capital and ventures as demanders, aiming for equilibrium through risk-adjusted expected returns. Market disequilibrium prompts foreign investor activity to restore equilibrium: inflows represent foreign investments in local ventures, boosting entrepreneurial activity, whereas outflows are exiting funds from local investors, incrementing investor sector activity. Drawing from a country-pair dyads dataset of VC investments between 88 countries from 2000 to 2019, our results suggest that uncertainty avoidance, the extent to which people in a society feel threatened by ambiguity and change, negatively affects both investors and ventures. Individualistic attitudes, reflecting the prioritization of personal goals over group goals, equally benefit both investors and ventures. A higher level of power distance (e.g. cultures where hierarchy and authority are respected) contributes to a larger private investors sector, particularly under the influence of strong FIs. The remaining dimensions, masculinity (a societal preference for achievement, heroism, assertiveness, and material rewards), long-term orientation (who prioritize future preparation, encourages thrift and modern education efforts, instead of maintaining traditions and being wary of societal change), and indulgence (who allows relatively free gratification of human drives) fail to show any significant effect on investors or entrepreneurs.

The contribution of this paper is threefold. First, we identify which informal institutional settings are most necessary for VC investment to flourish and how they impact investors and entrepreneurs differently, with differing overall results for overall activity in a country. This contributes to a clearer understanding of how institutions interact among themselves and with the VC market. Second, by developing a two-country market methodology, the study expands the international dimension of the VC literature. We present possible explanations for the discrepancies with the previous literature and alternative uses for this methodology. Third, based on our results, we offer some suggestions for policymakers that may help to promote local VC activity.

The paper is structured as follows. In the second section, we discuss the behaviour of formal and informal institutions in the context of VC. The third section describes the employed data and econometric methods. The fourth section provides our empirical results. The penultimate section discusses results and policy implications. Finally, we conclude by discussing potential avenues for future research based on the study's limitations.

Conceptual framework

Prior research has suggested that FIs can enhance market performance by reducing transaction costs and removing rigid administrative regulations (Djankov *et al.*, 2002; North, 1990). Venture capitalism, an institutional innovation itself, can be understood as the result of the converging creative reaction to the failure of various agents in the knowledge market. In particular, it can help reduce knowledge market failures by instituting an original and innovative structure of property rights (Antonelli and Teubal, 2008). In contrast, informal institutions shape societal behaviour through what are defined as belief systems (e.g. role models, independence, and trust), social norms/culture (e.g. community-wide normative, embeddedness, and a socially supportive culture) (e.g. Lofthouse and Storr, 2021), or cognitive aspects (e.g. skills, risk-taking, and leadership). Empirical evidence highlights that FIs are relatively easier to change in the short term, whereas informal institutions tend to endure longer (Ahlstrom

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and Bruton, 2006) and thus serve as antecedents of FIs (Williamson, 2000). Although some FIs are recognized as determinants of VC activity (Cumming *et al.*, 2010), there is no consensus on the influence of informal institutions on investors (Grilli *et al.*, 2019). Research on international VC reveals a significant gap in understanding VC firms' behaviour across country borders prompting the exploration of resource-based, capabilities, institutional, and network theories to fill this void (Wright *et al.*, 2005).

To understand how informal institutions affect VC activity, we use Hofstede *et al.*'s (1990) six culture dimensions: power distance, attitude towards individualism, masculinity, individual tendency to avoid uncertainty, long-term orientation, and indulgence. Although Hofstede's original study was designed for organizational culture, we contend that it is the most suitable choice, as these dimensions have been linked to national culture (e.g. Kattman, 2014), provides validated and transparent metrics (Bearden, 2006; Schimmack *et al.*, 2005), and their widespread use across disciplines (Alesina and Giuliano, 2015: 907) and cultural contexts (e.g. Gaganis *et al.*, 2019) allows for robust cross-cultural comparisons and insights with broad applicability (e.g. Gaganis *et al.*, 2019). Despite the original sampled data being dated, continual updates ensure its relevance (Hofstede Insights, 2023), as cultural traits tend to remain stable over time (Beugelsdijk *et al.*, 2015). Although national cultures maintain distinct trajectories (Inglehart and Baker, 2000), cultural differences between countries remain relatively constant (Beugelsdijk *et al.*, 2015), suggesting that a comparative analysis across countries should not change significantly.

Power distance refers to the extent to which members of a society accept and expect unequal distribution of power (Hofstede Insights, 2021). In societies with high score power distance, individuals conform to hierarchical structures without questioning, whereas those in low-power distance contexts seek to equalize power distribution. High power distance societies typically exhibit centralized power, top-down control, and bureaucracy. Studies have found a negative effect of high power distance on entrepreneurial activity (Puumalainen *et al.*, 2015) and innovation (Rinne *et al.*, 2012), leading to lower-quality entrepreneurship. Individuals from high power distance societies are more likely to engage in necessity-driven entrepreneurship (Sambharya and Musteen, 2014), associated with lower-quality self-employment. Therefore, it seems that power distance restricts the development of high-quality entrepreneurship.

From the investors' perspective, VC firms in higher power distance countries are more attuned to potential agency problems in foreign markets, prompting them to mitigate coordination and transaction costs (Dai and Nahata, 2016). However, evidence shows that these regions also exhibit low institutional trust (Kaasa and Andriani, 2022), and low tax morale (Andriani *et al.*, 2022a), creating unfavourable environment for investors. Moreover, power distance societies are prone to distortions related to agency conflicts and minority shareholders' expropriation, constraining externally financed growth for firms (Boubakri and Saffar, 2016). Therefore, we can expect that societies with a higher power distance value would be less likely to have local VC investors.

Farè *et al.* (2023) argue for the positive effect of democracy on entrepreneurship, suggesting that in more democratic societies, where power distance may be lower, investors may feel more confident in engaging in entrepreneurship and investment activities due to greater transparency and accountability in decision-making processes. Similarly, Audretsch and Fiedler (2022) present the Vietnamese entrepreneurship paradox, which sheds light on how entrepreneurs thrive in undemocratic contexts characterized by high power distance. By avoiding direct competition and leveraging institutional voids, entrepreneurs in such environments can navigate agency problems and create their own rules to adapt to the local business landscape.

In *individualistic* societies, interpersonal ties are loose, whereas in collectivistic societies they emphasize strong, cohesive in-groups (Hofstede *et al.*, 1990). People from individualistic societies prioritize personal achievement (Hayton *et al.*, 2002) and tend to be more innovative (Gorodnichenko and Roland, 2017) and creative (Rinne *et al.*, 2013), traits closely linked with entrepreneurship (Mickiewicz and Kaasa, 2022) and are therefore relevant to inflows. Conversely, collectivistic societies are also likely to have higher levels of necessity-driven entrepreneurship (Sambharya and Musteen, 2014), potentially leading to less desirable ventures for funding. Moreover, individualism can

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strengthen the effectiveness of democracy in promoting economic freedom (Moellman and Tarabar, 2022), and foster a 'willingness to act against corruption' (Amini *et al.*, 2022), thereby enhancing trust in institutions and thus a better investing environment.

With respect to the effect on VC, previous evidence links individualism with higher VC activity (Antonczyk and Salzmann, 2012; Li and Zahra, 2012). Additionally, VC managers from individualistic cultures are more likely to assert control when facing inefficiencies or preventing opportunism in cross-border syndicates (Dai and Nahata, 2016). However, collectivism could be a relevant characteristic for successful VC activity, as a higher level of syndicalization (i.e. cooperation with other VC investors) is related to better fund performance (Hochberg *et al.*, 2007).

Masculinity represents a societal preference for achievement, heroism, assertiveness, and material rewards, fostering a competitive environment. In contrast, feminine societies emphasize cooperation, modesty, caring for the weak, caring for the quality of life, and being more consensus-oriented (Hofstede Insights, 2021). Masculine societies are more entrepreneurial-oriented (Mueller *et al.*, 2002), as material success from successful entrepreneurial venture is socially valued, leading to recognition and social prestige for successful entrepreneurs. As such, we could expect that more foreign investments would be attracted to countries actively looking for this pool of ambitious entrepreneurs.

From the investor's side, evidence suggests that masculinity is valued, as VC managers from masculine cultures are more inclined to assert control and prevent opportunism in cross-border syndicates (Dai and Nahata, 2016). Additionally, institutional investing portfolios in countries with higher levels of masculinity tend to be more diversified abroad (Anderson *et al.*, 2011), supporting outflows. However, this argument contradicts Aggarwal and Goodell (2014), who found evidence that higher masculinity may hinder firms' ability to access VC funding. If masculinity harms entrepreneurial activity and supports VC activity, it suggests a need for local investors to seek opportunities abroad due to a lack of local firms looking for funding.

Uncertainty avoidance describes a society's comfort level with unknown, surprising, and unusual situations (Antonczyk and Salzmann, 2012; Hofstede *et al.*, 2010). Unpredictability makes some societies more anxious and less likely to engage in risky activities, such as starting up or investing in new ventures. Previous research shows that societies that are highly characterized by uncertainty avoidance are less entrepreneurial (Kreiser *et al.*, 2010) and less involved in investment activity (Aggarwal and Goodell, 2014; Cumming *et al.*, 2016a). Furthermore, extensive literature has been published regarding the link between risk-taking and entrepreneurship since Knight's (1921) seminal work. In particular, uncertainty-accepting societies are more innovative than uncertainty-avoiding societies (Shane, 1993). As the type of projects that VC managers are funding are those with a high risk and high yield of return, which are prone to innovation, a less innovative society will imply fewer domestic startups to fund. Thus, we can expect that a more uncertainty-avoidant society should be less prone to VC activities and entrepreneurial intention. Moreover, markets with industrial or geographic uncertainties can negatively impact VC investment performance (Cheng and Tang, 2019). Regardless, it is unclear which side of the market is more affected.

Cultures with *long-term orientations* encourage thrift and modern education efforts for future preparation (Hofstede Insights, 2021), whereas those with shorter orientations prioritize maintaining traditions and are wary of societal change. As fund-seeking ventures are more likely to take risks and innovate, potentially disrupting the *status quo* (Zheng *et al.*, 2020). Therefore, countries with a low level of long-term orientation would not actively encourage VC or innovative entrepreneurial activity. Consistent with this, research has linked long-term orientation with higher initial public offerings (Gupta *et al.*, 2018), whereas cultures with low long-term orientation tend to have high financial crime rates (Yamen *et al.*, 2019), suggesting constraints on FIs and, therefore VC activity.

Furthermore, an *indulgent* society allows relatively free gratification of human drives and enjoyment, whereas restrained societies encourage the suppression of needs and regulates gratification by means of strict social norms (Hofstede, 2011). Previous studies have stated the importance of indulgence on entrepreneurial rates (Kedmenec and Strašek, 2017), yet its impact on VC activity remains unexplored.

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Regarding the *interconnection between institutions and culture*, the literature generally agrees on a two-way causal relationship (see e.g. Andriani *et al.*, 2022b). On the one hand, collectivism, trust, and culturally induced diffusion of political ideology can shape different types of institutions (see e.g. La Porta *et al.*, 1998). For example, collectivist norms originated from Judeo-Muslim beliefs lead to institution that lacks effective legal contract enforcement, contrasting with individualistic values originating from Christian beliefs (Greif, 1994). For Guiso *et al.* (2008), varying levels of trust can suggest distinct requirements concerning investor safeguards or other regulatory factors, thereby leading to different types of financial institutions with varying degrees of contract enforcement capabilities. On the other, institutions driven by ideologies such as communism may not significantly influence cultural changes (see e.g. Roland, 2004), prolonged exposure to such ideologies can embed pro-government behaviours in cultural values, as seen in the East *versus* West Germany case (Alesina and Fuchs-Schündeln, 2007). This interconnectedness highlights the importance of understanding how cultural values and institutional changes interact in a potential two-way causation, motivating our study, as the informal institutions measured in this paper are based on various cultural traits.

Venture capitalism involves two-sided activity, where both formal and informal institutional arrangements shape both sides of VC activity. FIs impact entrepreneurial activity by attracting foreign investors drawn to countries characterized by technological, legal, financial, and political institutions that foster innovation, protect investor rights, facilitate exits, and guaranteed regulatory stability (Guler and Guillén, 2010). Similarly, entrepreneurs can even help shape institutions themselves (Henrekson and Sanandaji, 2011). Although the previous literature emphasizes the importance of FIs in VC activity, it offers little insight into whether investors or investees are more sensitive to them (Grilli *et al.*, 2019). On the contrary, culture influences the relationship between FI and development by shaping the contextual conditions under which economic and political rules are enacted within societies, thereby affecting the outcomes of formal institutional arrangements on development processes. In this way, culture can affect development through FIs by providing a foundation upon which the different economic and political rules of the game emerge and 'stick' within societies (see e.g. Acemoglu and Jackson, 2017). Thus, informal institutions moderate the way FIs affect development, and analogously, we expect a similar dynamic in the effect on VC.

Finally, informal institutions can substitute for weak FIs in promoting trade (Lanz *et al.*, 2019). In the case of VC, to the best of our knowledge, it has been investigated empirically by only two studies. In particular, Li and Zahra (2012) showed that the development of FIs supports the level of VC activity, although this effect is weaker in more uncertainty-avoiding or collectivist societies. Moreover, Cumming *et al.* (2016a) found similar findings, where higher governance mechanisms can intervene and support VC activity in highly uncertainty-avoidant cultures.

Method

Our approach draws on an expanded model based on Schertler and Tykvová (2012), shown in equation (1), where $flows_{ijt}$ are the yearly cross-border inflows and outflows between countries, II_i time invariant informal institution of the local country, X_{ijt} country-pair's control variables, y_t, f_j yearly and foreign country-fixed effect, and ε_{ijt} the error term:

$$flows_{ijt} = \alpha + \gamma_1 II_i + \gamma_2 X_{ijt} + \beta_1 y_t + \beta_2 f_j + \varepsilon_{ijt} \quad (1)$$

We use two dependent variables for representing VC activity: inflows and outflows, both positive and measured as the monetary amount of raised funds, adjusted by GDP and in log form. Outflows are funds from local VC investors going into ventures located in a foreign country, and inflows are funds that local ventures attract from other countries. To build our dependent variables, we gather a large set of VC deals from 2000 and 2020, aggregating all investors' individual fundings into country-pairs between the source and destination of funding, discarding country-pairs with no activity between them.

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The framework of FIs comprises a set of political, economic, and contractual rules rather than just some specific institutional policies or VC-oriented government programmes. There are many components of a national context that can affect entrepreneurship beyond cultural traits; see e.g. the informal economy (Webb *et al.*, 2013), social cost of failure (Lee *et al.*, 2021), various regulations of direct import to entrepreneurs (such as intellectual property rights, business laws, banking laws, bankruptcy laws, trade laws), policy changes, industry structures (which can greatly differ across nations), corruption, political systems, religious systems, etc. We recognize that all these are relevant to both entrepreneurial firms and VC activity. Meaningful comparisons across countries and time can be made using the World Governance Index (Kaufmann *et al.*, 2011) to measure the development of FIs. As its six institutional dimensions are highly correlated and we are only interested in the composite effect of this dimension, we follow previous studies and use the first dimension of a principal components analysis, accounting for 75% of total variance. To measure informal institutions, we include one variable for each of the six dimensions of Hofstede's national culture measure.

Additional market characteristics must be accounted for as controls. First, VC investments are volatile and cyclic, depending on economic cycles (Bernstein *et al.*, 2019). We control for economic volatility by including the unemployment rate and its percentage growth rate as control variables. Second, we also include a patent count (per 1 million inhabitants) to control the country's innovative level. Additionally, evidence links a higher intensity and higher returns of VC funding in countries with a high stock market capitalization/GDP ratio (Grilli *et al.*, 2019). Finally, we add usual bilateral trade controls used in the VC and trade literature such as common language, distance, and other. See Table 1 for included variables and summary statistics.

Model specification

As cultural dimensions in our model are time-invariant, a fixed-effects estimator could not be used to estimate their impact on the dependent variables. A Breusch and Pagan Lagrangian multiplier test also rejected the need for adding random effects; thus, panel ordinary least squares (OLS) was used. Finally, we lag all variables 1 year to take into account the lengthy processes involved in venture funding, such as due diligence and the length of funding rounds.

Although we have argued that the Hofstede cultural data allow for comparison between countries, we also try different approaches and proxies with more recent data to validate our results further. First, the literature has shown that a higher power distance is related to autocratic tendencies, being on individual (Terzi, 2011), managerial (Chen *et al.*, 2022), or government level (Boateng *et al.*, 2021; Hofstede, 2013). Thus, we include government authoritarianism as a power distance proxy. Second, the literature has shown that individualism is confounded with growth and the level of FIs (Gorodnichenko and Roland, 2011, 2017). Moreover, Licht *et al.* (2007) have shown that individualism and/or low power distance are conducive to the rule of law, the absence of corruption, and the quality of governance. To reduce any endogeneity related to these relations, we employ two-stage least squares (2SLS) techniques where the blood distance between the countries and the UK, one of the most individualist countries, as instrumental variable for individualism (Gorodnichenko and Roland, 2017).

Specifically, we measure genetic distance as the Mahalanobis distance between the frequency of blood types A and B in each country and the frequency of blood types A and B in the UK. Because no clearly identified evidence shows that blood types directly impact risk perception or preference for investing in VC, it is arguably acceptable that genetic distance based on blood type satisfies the exclusion restriction.

Results

We report our empirical analysis results in Table 2. Columns (1) and (2) contain the results of the main regression on inflows and outflows. First, uncertainty avoidance negatively affects both investors and ventures (supporting Li and Zahra, 2012), but this negative effect is greater on inflows. This

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Table 1. Variables and data sources' summary

Variable	Mean	Std. dev.	Min	Max	Description
Dependable variables					
Inflows	69.136	449.731	0	23.000	Value in million USD of flows between a country-pair. *Source*: Crunchbase.
Outflows	68.392	445.419	0	23.000	
Inflows (log, %GDP)	1.931	2.117	0	12.285	Natural logarithm of (1 + In/out flows, normalized by their average GDP in billion US dollars).
Outflows (log, %GDP)	1.813	1.99	0	13.006	
Institutional factors					
Power distance	52.242	20.053	11	104	Scale from low power distance to high power distance. *Source*: Hofstede Insights.
Individualism	58.891	24.895	12	91	Scale from collectivistic to individualistic. *Source*: Hofstede Insights.
Masculinity	52.082	19.315	5	110	Scale from feminine to masculine. *Source*: Hofstede Insights.
Uncertainty avoidance	57.168	23.265	8	112	Scale from low uncertainty avoidance to high uncertainty avoidance. *Source*: Hofstede Insights.
Long-term orientation	53.112	22.497	0	100	Scale from short-term orientation to long-term orientation. *Source*: Hofstede Insights.
Indulgence	52.741	18.788	0	100	Scale from restraint to indulgence. *Source*: Hofstede Insights.
Formal Institutions	0.328	2.182	−6.276	3.037	Principal component analysis of all six World Governance Index indicators and calculated as Formal institutions = [Control of Corruption × 0.4275 + Government Effectiveness × 0.4232 + Regulatory Quality × 0.4233 + Rule of Law × 0.4313 + Voice and Accountability × 0.3623 + Political Stability and Absence of Violence/Terrorism × 0.3758]. *Source*: World Bank.
Controls					
GDP growth	2.834	2.885	−15.136	24.37	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in billion US dollars. *Source*: World Bank.
Patents per GDP	12.321	22.514	0	134.877	Number of patent applications made by residents of the country, relative to the country's GDP in billion US dollars. *Source*: World Bank. For Taiwan data: tipo.gov.tw.
Unemployment rate	6.735	3.835	0.25	31.5	Yearly (%) share of the labour force that is without work but available for and seeking employment. *Source*: World Bank.
Market capitalization	99.128	153.821	0	1274.789	Market capitalization of listed domestic companies (% of GDP). *Source*: World Bank.

(*Continued*)

Table 1. (*Continued.*)

Variable	Mean	Std. dev.	Min	Max	Description
Common language	0.241	0.428	0	1	Dummy for countries sharing a common official or primary language. *Source*: CEPII Gravity Database.
Geographical pop-weighted distance	5.853	4.397	0.13	19.517	Population-weighted distance between most populated cities, measured in thousand km. *Source*: CEPII Gravity Database.
Contiguous countries	0.101	0.301	0	1	Dummy that equals 1 if the countries are contiguous. *Source*: CEPII Gravity Database.
Regional trade agreement	0.485	0.5	0	1	Dummy that equals 1 if the origin and destination country are engaged in a bilateral regional trade agreement of any type within the given year. *Source*: WTO.
Colonial relationship	0.06	0.238	0	1	Dummy that equals 1 if the country-pair was ever in a colonial relationship. This variable also takes into account colonial relationships before 1948 and is a bilateral variable. *Source*: CEPII Gravity Database based on Head *et al.* (2010).
Same colonizer	0.178	0.383	0	1	Dummy that is equal to 1 if the pair was ever in a sibling relationship (i.e. they ever had the same hegemon). This variable also takes into account colonial relationships before 1948 and is a bilateral variable. *Source*: CEPII Gravity Database based on Head *et al.* (2010).

World bank data obtained using Azevedo (2011) Stata module.

Table 2. Empirical results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS baseline results		Autocracy as a proxy for power distance		First-stage 2SLS	Second-stage 2SLS		OLS baseline results with interaction effects	
Variables	Inflows (log)	Outflows (log)	Inflows (log)	Outflows (log)	Individualism	Inflows (log)	Outflows (log)	Inflows (log)	Outflows (log)
Mahalanobis distance from UK					−13.080***				
					(0.000)				
Power distance index	0.011	0.022***	−0.009	0.086**	−0.022	0.008***	0.017***	0.008	0.021***
	(0.126)	(0.000)	(0.865)	(0.011)	(0.107)	(0.000)	(0.000)	(0.308)	(0.000)
Individualism	0.031***	0.030***	0.028***	0.026***		0.039***	0.044***	0.028***	0.030***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
Masculinity	0.006*	0.006**	0.004	0.005	0.146***	0.001	0.000	−0.002	0.004
	(0.063)	(0.023)	(0.346)	(0.120)	(0.000)	(0.526)	(0.853)	(0.692)	(0.437)
Uncertainty avoidance	−0.017***	−0.012***	−0.015***	−0.005*	−0.300***	−0.010***	−0.004***	−0.021***	−0.014***
	(0.000)	(0.000)	(0.000)	(0.098)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Long-term orientation	−0.008	−0.001	−0.008	0.001	−0.103***	−0.012***	−0.005***	−0.007	−0.000
	(0.281)	(0.932)	(0.277)	(0.835)	(0.000)	(0.000)	(0.000)	(0.289)	(0.987)
Indulgence	−0.002	0.007*	−0.005	0.006	−0.300***	−0.000	0.009***	0.005	0.007
	(0.716)	(0.083)	(0.411)	(0.106)	(0.000)	(0.951)	(0.000)	(0.511)	(0.126)
Formal Institutions	−0.123*	0.071	−0.189***	−0.034	4.852***	−0.228***	−0.088***	−0.755***	−0.376*
	(0.062)	(0.198)	(0.003)	(0.432)	(0.000)	(0.000)	(0.000)	(0.000)	(0.059)
FI × Power distance								0.006**	0.004**
								(0.017)	(0.033)
FI × Individualism								0.001	0.002
								(0.849)	(0.293)

(*Continued*)

Table 2. (*Continued.*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS baseline results		Autocracy as a proxy for power distance		First-stage 2SLS	Second-stage 2SLS		OLS baseline results with interaction effects	
Variables	Inflows (log)	Outflows (log)	Inflows (log)	Outflows (log)	Individualism	Inflows (log)	Outflows (log)	Inflows (log)	Outflows (log)
FI × Masculinity								0.006**	0.002
								(0.016)	(0.230)
FI × Uncertainty avoidance								0.002	−0.001
								(0.334)	(0.231)
FI × Long-term orientation								−0.003*	0.000
								(0.065)	(0.832)
FI × Indulgence								−0.001	0.000
								(0.740)	(0.932)
Constant	−1.184*	1.456**	−0.382	2.271***	110.205***			−0.087	1.809***
	(0.062)	(0.042)	(0.609)	(0.000)	(0.000)			(0.893)	(0.006)
Observations	9,997	9,997	9,283	9,283	9,005	8,988	8,988	9,997	9,997
Number of home countries	86	86	81	81				86	86
Years	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foreign country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.414	0.332	0.420	0.345	0.810	0.171	0.191	0.427	0.337

OLS results of the institutional effect on VC inflows and outflows. Columns (1) and (2) report OLS results of the informal institutional effect on VC inflows and outflows in a country. In columns (3) and (4), we replace power distance with a time-variant government autocracy level as a proxy. Columns (5)–(7) show a 2SLS regression analysis, where we instrumentalize individualism with the Mahalanobis distance of frequency of blood types A and B in a given country relative to the frequency of blood types A and B in the UK. Blood type data and approach come from Gorodnichenko and Roland (2017). Column (5) shows the first stage with individualism as the dependable variable, and columns (6) and (7) show the second stage of the approach. Columns (8) and (9) contain interaction effects of all Hofstede dimensions with the level of FIs. Controls are omitted for clarity and are available in the Supplementary files. Robust *P* values are displayed in parentheses.

suggests that a higher degree of uncertainty avoidance has a larger impact on entrepreneurial ventures than investors (−0.017 and −0.012). Second, individualistic attitudes equally support both investors and ventures while being the cultural dimension with the higher magnitude effect (+0.031 and +0.030). Third, a higher level of power distance contributes to a larger private investors sector. Power distance on inflows is non-significant, although theory indicates that a more autocratic society should negatively affect entrepreneurs (Ahlstrom and Bruton, 2006). Fourth, results on masculinity, long-term orientation, and indulgence are not conclusive and thus left out of the rest of the analysis. Finally, our results suggest that high-quality FIs should decrease inflows. This implies that under an improved formal institutional setting, the enhancing effect on investors is larger than that on ventures. As such, local investors take all available funding opportunities, as the lack of non-funded projects also reduces the inflow of foreign flows due to the strength of the domestic VC market.

In columns (3) and (4), we proxy power distance by the yearly level of the autocracy levels of each country's government, which supports previous results with similar significance and direction of previous effects. Next, columns (5)–(7) display results using instrumental variables (genetic distance between country-pairs) as an instrument for Hofstede's individualism scale. Although column (5) presents the first stage, showing that countries less genetically distant from the UK tend to have more individualist cultures, the results of the second stage in columns (6) and (7) are consistent with our previously observed link between investor flows and informal institutions.

In columns (8) and (9), we add interaction effects between FIs and each of the six cultural dimensions. Although none of the main effects disappears, a positive interaction exists between power distance and FIs on inflows and outflows,[1] suggesting that in addition to investors benefiting from a higher power distance, entrepreneurs can benefit from this setting, but only if FIs are well developed.

Finally, we performed robustness checks to ensure that the reported results are not overly sensitive to reasonable changes in the data (outlier analysis, different measures of data imputation), alternative explanations such as the effect of entrepreneurial activity, differences in interest rates or the relevance of cultural distance between the countries (Moore *et al.*, 2015), among others, or modelling assumptions (avoiding the use of dyads, or adding country dummies). The results of these checks are in line with previously reported and are available in the Appendix.

Discussion

Our analysis suggests that the effect of informal institutions on VC activity differs for investors and ventures. For instance, a high level of power distance only contributes to investment activity and is enhanced for both entrepreneurs and financiers when strong and robust FIs are in place. In high power distance cultures, domestic investors may indeed be more motivated to invest abroad, leading to an outflow of capital from their home country. This dynamic reflects the notion that higher power distance cultures may encourage investors to seek opportunities beyond their borders, contributing to increased foreign investment. More specifically, our results suggest that unless the presence of strong FIs is somehow able to offset the disadvantages of high power distance (e.g. limited communication between different socioeconomic strata), the affected nations might find it difficult to encourage their citizens to be entrepreneurs when individual inequalities are not only expected but also desired. A possible reason for this finding may be the social role that entrepreneurs play in society as the guarantors of new venture activity. To the extent that clear market regulations, predictable taxes, and consistent legislation, among other aspects, confer institutional stability, entrepreneurs are more willing to accept differences in power and wealth. However, because investors' involvement in their founded entrepreneurial activity is outside of day-to-day management, this social relationship-based argument does not apply.

We also shed light on the findings of the previous literature. For example, prior evidence has indicated that a high power distance is harmful to entrepreneurs, but its effect on overall VC activity is

[1]Marginal effects plotting further confirms these results (available in the Appendix).

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inconclusive (see Table B1 in the Appendix). However, separating the activities of ventures from those of investors, our results suggest that the investor actually benefits from a high power distance setting. When adding interaction effects as a moderator, the results suggest that if FIs are robust enough, entrepreneurs can also benefit from these conditions. This is contrary to the literature, which suggests that an autocratic setting (i.e. high power distance) makes it more difficult to develop ideas outside of the *status quo* (Rinne *et al.*, 2012) and thus generally exhibits lower technological innovation performance (Wang *et al.*, 2021). For Lerner (2009), evidence has shown that local VC markets do not emerge by themselves and require consistent government support to kickstart them. This requires continuous effort and strong FIs to be in place. These two characteristics fit autocratic governments' support of markets, which is a main advantage according to scholars, but only in those cases where the autocratic time horizons for long-term planning are sufficiently long (Bak and Moon, 2019; Cui and Moon, 2020). Furthermore, when focusing on countries with the highest value of interaction between high power distance and formal institutional development, successful VC markets, such as Hong Kong, Belgium, South Korea, or Singapore, top the list.

Another possible explanation of these results comes from Sáenz-Royo and Lozano-Rojo (2023), who studied under a simulation setting that decisions on innovation selection (certainly the role of VC managers) tend to be higher in an authoritarian setting, in contrast to a collective decision from the company. They argue that given managers' bounded rationality, allowing a collective decision on which projects to implement shifts the organization into a more cautious position. In contrast, an authoritarian manager (i.e. with a higher power distance) will tend to accept, even erroneously, more innovations to implement.

Our results also build upon previous findings regarding informal institutional effects on VC, specifically Li and Zahra's (2012) findings about the positive influence of individualism and the non-avoidance of uncertainty on VC activity. Separating this activity according to its actors results in a more fine-grained analysis: uncertainty avoidance in society negatively affects a VC market by affecting both investor and investee. In contrast, individualism affects both positively and equally.

Finally, this study fills an empirical gap in the current literature by using a large sample of countries and is, therefore, highly representative. Most research on institutions' effects on VC in the last decade considers only a small number of (mostly European) countries. In fact, among the 16 articles that included the role of informal institutions in their analysis, only five took a global approach (Grilli *et al.*, 2019). As prior research recognizes, this characteristic can bias the current understanding of the role of informal institutions.

Implications

Although we acknowledge that creating an ideal list of cultural conditions for VC activity is an unattainable goal, our results suggest that depending on the quality of FIs in place, there are different optimal informal institution configurations. This idea aligns with other studies (Hain *et al.*, 2016), who suggest that a lack of FIs can be compensated by culture, specifically suggesting that trust can mitigate the negative effect of geographic and cultural distance in funding deals. Furthermore, institutional trust is more relevant to investments in emerging economies, where investors are less protected by FIs in place. In contrast, relational trust is more relevant to investments in developed economies. Grilli *et al.* (2018) came to a similar finding, which states that the positive relationship between social capital and VC activity appears to be mediated by the level of structural FIs in place. In societies with weak FIs, the contractual funding relationships are usually covered by cultural relationships (family, reputation, etc.). However, any such configuration that the entrepreneurial ecosystem obtains may be suboptimal, such as having less successful exits (Bottazzi *et al.*, 2016), or increasing investment to ensure control but losing portfolio diversification (Khoury *et al.*, 2015).

As formal and informal institutions affect investors and ventures differently, policymakers need to fine-tune their approaches. Instead of developing policies for attacking the domestic VC market as a single unit, they must consider all of its elements, including the possibility of foreign activity. As the

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recent entrepreneurship literature emphasizes not following textbook guidelines as if they were magic formulas (Brown and Mason, 2017), failing to consider a country's specific cultural characteristics before implementing VC programmes can lead to inefficient results. Getting a local VC market up and running is no easy task, as direct government intervention through ad hoc programmes designed to stimulate the emergence and development of VC has been shown to have, at best, mixed results (Lerner, 2009). Although FIs can be developed following written procedures, cultural change is more challenging to achieve, as it is ingrained in the population. We therefore recommend different strategies depending on the initial institutional setting in place.

First, policymakers can take advantage of cultural characteristics to cover missing FIs throughout institutional development (Ahlstrom and Bruton, 2006). Prior evidence has shown that in an undeveloped formal setting, entrepreneurs and investors exploit aspects of local informal institutions, such as trust (Hain *et al*., 2016) or social capital (Grilli *et al*., 2018), to participate in VC activity. From the investor side, Zacharakis *et al*. (2007) compared how the funding decision policies of VCs can vary depending on the level of institutional development. FIs in a rule-based market economy (i.e. the USA) depend upon market information, whereas in a transitional economy (i.e. China), they depend more heavily on human capital factors. This propensity is also seen from the demand side, as entrepreneurs from an underdeveloped formal setting and a culture that emphasizes the value of social obligation have a greater propensity to use network methods rather than the market for funding (Zhang and Wong, 2008).

Second, policymakers may import foreign VCs to cover for the lack of domestic investors while informal institutions develop to support their organic emergence. When analysing the success of entrepreneurial ecosystems, Mason and Brown (2014) argue that the presence of local VC funds is not essential for their growth, as they can be imported from other countries. This is supported by the additional benefits that they can bring, such as knowledge spillovers, international networks, or better performance. Additionally, foreign VCs can help legitimize the local market with their tougher screening (Nahata *et al*., 2014) or divergent judgement as to when to disinvest in failing projects (Devigne *et al*., 2016).

Finally, as certain features of informal institutions, such as culture, are difficult to change in a country, if the conditions are not ideal for VC market development (e.g. if there exists a collectivistic or uncertainty-avoidance society), policymakers can focus on replacing the lack of local investors or entrepreneurs with foreign actors. As they can help accelerate cultural change due to knowledge spillovers that occur while funding local ventures (Chahine *et al*., 2019), this would be more efficient than investing in fostering the local market where cultural variables can slowly change. For example, Bustamante *et al*. (2021) showed how, in the 2000s, the Chilean government spent 15 years developing the investor market by leveraging private VC vehicles without any success in kickstarting a private market. Government intervention in the economy is traditionally legitimized by market failures (Vogelaar and Stam, 2021), using an 'if the market doesn't build it, the government will' mentality. In this case, Bustamante argues that the problem was a lack of quality entrepreneurs. In fact, once the social legitimization of entrepreneurship as a career choice took place (as one of the variables proxying for informal institutions), thanks to initiatives such as the entrepreneur-importing 'Startup Chile', VC investments began to grow organically (Stephens, 2019). However, even then, most of the investments in local ventures came from foreign sources, as the domestic investor market has still not fully developed. In contrast, we have the case of Israel, where instead of focusing on developing local VCs through investment, they decided to focus explicitly on attracting foreign investors. The programme's success, plus the knowledge spillovers that they brought, allowed some of the local partners to spin off and establish their own firms, which global investors were eager to fund because of their track record (Lerner, 2009: 156). In contrast, Japan, a country with modest to low entrepreneurial activity (Lubbadeh, 2019), is famous for SoftBank's Vision Fund, the world's largest technology-focused investment fund, with offices and funded startups all over the world. With Japan having all the tools for a robust VC market but lacking entrepreneurs and ventures, their investors moved on to other markets (Lerner, 2009: 156).

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Limitations and future work

The employed methodology is limited in several ways, which can be used as suggestions for future work. First, operationalizing institutions into a set of variables forced us to leave aspects of each nation's characteristics out of the study, such as the role of government policies (Bianchini and Croce, 2022), programmes such as accelerators (Robinson, 2022), or other legal variables (Smith *et al.*, 2022), or other cultural dimensions such as Schwartz (1994) religion (Chircop *et al.*, 2020).[2]

Secondly, in striving for global applicability, this study could not capture detailed, non-comparative information that might prove valuable and better suited for more context-specific research. For example, Cumming *et al.* (2010) argue that certain VC-backed firms relocated to countries with more developed legal frameworks. Future research can address this gap by focusing on the migration patterns of ventures or entrepreneurs instead of monetary flows.

Thirdly, our findings and previous research indicate the need for further exploration to fully comprehend the impact of power distance on investors and VC activity. Therefore, there is a need for a more in-depth investigation into the relationship between power distance and VC activity. Examining the empirical context, differences in the level of analysis or exploring alternative approaches could provide additional explanations on why seemingly contradictory evidence may be rational.

Fourthly, how we measure flows can induce other cases not considered in the study. For example, if a cultural score has a positive impact on outflows and a negative impact on inflows, there is the possibility that this is a case of capital flight, whereas local investors are exiting the local market for a unsupporting institutional setting. Effectively, higher outflows of VC flows could imply that more funds are exiting the country. However, as VC is only a small subsample of all cross-country foreign direct investments (FDI), a negative effect on outflows could be instead that investors are exiting only from the VC market in specific and could be switching to other local or international less risky, FDI-related investing opportunities. Nonetheless, this scenario is not the case in any of the six cultural dimensions in our results.

Finally, the study was conducted in the empirical context of aggregate secondary comparative data. This approach undoubtedly has its boundary conditions and limitations. Can we truly assume individual traits, especially when talking about entrepreneurs and VCs, based on national averages? Further analysis is needed with more fine-grained data. As a result, another approach to finding an ideal set of cultural characteristics for fostering VC could be changing the paradigm from that of an 'optimum solution' to that of a configurational approach. As our model does not deal with interactions between all sets of cultural variables, other methodologies such as fuzzy-set qualitative comparative analysis could be used to find other configurations of variables that are not considered in this work.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.17605/OSF.IO/UJXFW.

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[2]In the Appendix, we provide regressions including some of these.

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