Cultural Difference and China's Cross-Border M&As: Language Matters

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ABSTRACT

This paper studies the effect of language and culture on China's cross-border mergers and acquisitions during 1997-2017 in 126 host countries. We use the gravity model and adopt common official language, common spoken language and common native language between China and host countries to measure the level of official support, ease of communication and mutual trust, respectively. We find that language proximity boosts China's cross-border M&As significantly in terms of aggregate value, total number and deal success rate. Cross-sample comparisons show heterogeneous effects of language and culture in developing host countries versus developed host countries as well as manufacturing industries versus service industries.

KEYWORDS: Common language; Cultural proximity; China's cross-border M&As
JEL Codes: F20; Z10; Z13

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1 Introduction

With the recent development of globalization and the "Belt and Road" Initiative, China's cross-border M&A investment has witnessed unprecedented growth. Statistics show that the number of cross-border M&A deal of Chinese companies soared from 31 in 1997 to 317 in 2017, a ten fold increase within two decades (see Figure 1). Meanwhile, the total number of deals worldwide only increased one and a half times (from 4249 to 6967). In terms of net deal values, China's cross-border M&As grew over forty times from 3.1 to 130.9 billion US dollars by the end of 2017 while the world total barely quadrupled (from 187.3 to 694.0 billion US dollars) during the same period.

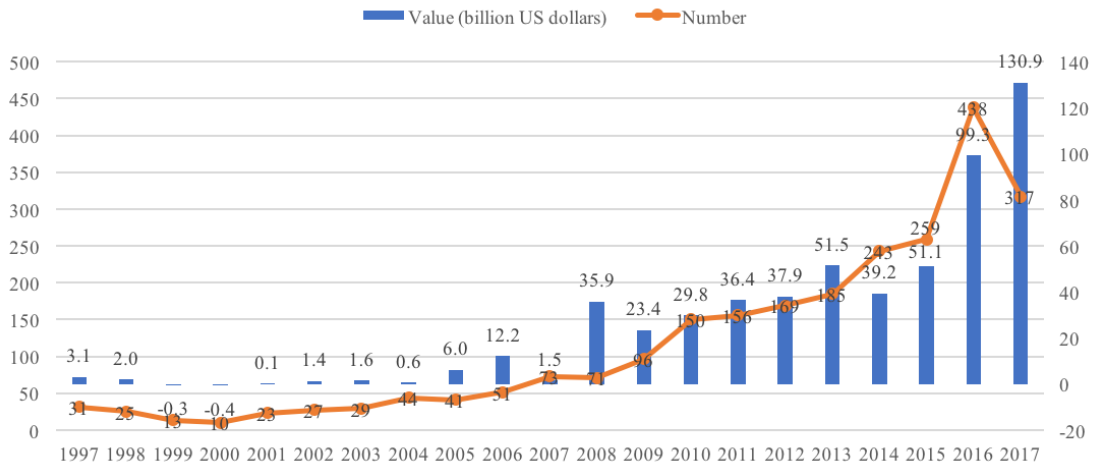

Figure1. China's net cross-border M&A deal growth.[1]

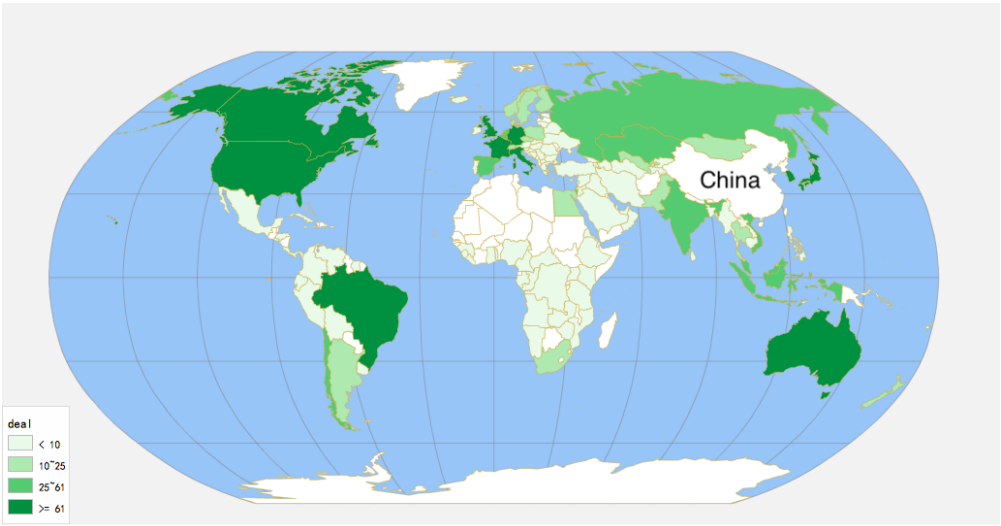

Figure 2. China's outward cross-border M&A deal distribution.

If we examine the flow of China's cross-border M&A investment, we may find some patterns in the distribution of destinations. Figure 2 displays the cumulative number of cross-border M&A deals in each host country over the years. Among all regions, North America, part of South America and Oceania are the major investment destinations. Western Europe, Japan and South Korea absorb relatively large amounts of M&A investment as well. In general, China's outward cross-border M&As flow mainly to developed economies whose native language is English and to adjacent countries with more cultural

[1]See the UNCTAD (United Nations Conference on Trade and Development) World Investment Report 2018 http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx

resemblance. One may wonder about the relationship between language, culture, and international M&A investment. If so, what aspects of language and culture facilitate China's cross-border M&A transactions?

In practice, cross-border M&A deals are carried out through negotiations between stakeholders, during which process the representatives of each party gather at the table to discuss the terms of agreement in detail regarding deal values, stake acquired, method of payment and duration, etc. It can take months or even years to close a deal, therefore, effective communication is vital to the transaction outcome. The language proficiency of company deputies and the understanding of national culture as well as commercial norms of the counterparts might change the atmosphere of the conversation and turn the negotiation towards a different direction. Cultural proximity may create a sense of closeness that boosts mutual trust and understanding, reduces potential hostility and thus leads toward a satisfactory result where each party involved are able to realize their initial appeals in order to benefit from the arrangement. Former research has focused on various aspects of cross-border M&As such as institutional environment, financial performance and cultural proximity (e.g. Buckley et al., 2007; Zhang and Zhou, 2010; Head et al., 2010, Liu et al., 2016). In this paper, we pay special attention to language and study the effects of cultural factors on China's burgeoning cross-border M&A investment. We hypothesize on the importance of languages and the impacts of various national cultural dimensions during the process of China's massive wave of "Going Out" [2] with firm-level data from the BvD Zephyr global M&A database. We adopt a gravity model to study the influence on aggregate M&A deal volume, a poisson regression for the number of deals and a logit model for the success rate of M&A transactions. Examining cross-border M&A performances from various aspects helps to provide a more comprehensive understanding on the role of language and national culture.

The next section reviews the literature on language and cultural influences in international economics with particular focus on cross-border M&As. It is followed by a description of the empirical model set-up with data description. Section 5 presents and interprets estimation results in detail. Section 6 provides further analysis and extensions. The last section summarizes the main findings and discusses their implications in practice.

2 Literature

Former research on international trade and investment usually treated language as a control variable and a common official language dummy was introduced to measure its influence on foreign direct investment (e.g. Head and Ries, 2008; Baier and Bergstrand, 2009; Eaton and Kortum, 2010). However, the importance of language is likely to be underestimated. Melitz and Toubal (2014) pointed out that besides official language differences among countries, there are also spoken language that reflects the contribution of translation and interpretation to ease of communication as well as native language that measures ethnicity and trust between nations. Together with language proximity, the effect of the multi-faceted factors of language is at least twice as great as the conventional language dummy. Besides common language, Joshi and Lahiri (2015) established language friction index (LFI) to gauge language differences in R&D alliance formation. Kroon et al. (2015) adopted lingua franca (usually English) fluency and explored the influence of individuals' language ability on their performance in cross-border mergers. Furthermore, Cuypers et al. (2015) took average TOEFL scores as a proxy of lingua franca proficiency and find that linguistic distance lowers the equity stakes obtained from foreign targets in cross-border acquisitions.

Apart from language, there are other factors related to cultural differences. One common practice in research related to China is to look into the influence of Confucian cultural convention. The Confucian tradition has profound influence on the lifestyle and ideology of Chinese people and serves to some extent as a religious belief. The method of measuring the influence of Confucianism ranges from a Confucian dummy (Ye et al., 2012; Zhang et al., 2010) to the number of Confucian temples (Jin et al., 2017) and Confucius Institutes (Xie et al., 2017; Lien et al., 2012). This line of literature concludes that cultural proximity, education and language learning promotes China's foreign direct investment and trade (Lien 2013; Lien et al., 2012; Lien and Co, 2013). However, the Confucian teaching tends to reduce corporate risk-taking and therefore lowers rate of return (Chen et al., 2017). Another major method in cultural analysis is Hofstede's national cultural dimensions which entails six aspects of cultural indicators derived from the serial research of Dutch psychologist Geert Hofstede dating back to the 1980s (Hofstede, 1980; Hofstede et al., 2010, etc.). Hofstede deconstructed national cultures into Power Distance (PDI), Individualism versus Collectivism (IDV), Masculinity versus Femininity (MAS), Uncertainty Avoidance (UAI),

[2] The phrase refers to the Chinese government policy of encouraging companies to invest overseas.

Long-Term versus Short-Term normative Orientation (LTO) and Indulgence versus Restraint (IND) to study their characteristics in different dimensions.

Several studies find that national cultural proximity improves communication, increases cross-border M&A success rate and is beneficial to post-merger integrations (Kogut and Singh, 1988; Kim and Hwang, 1992; Hennart and Reddy, 1997; Barkema and Vermeulen, 1998; Brouthers, 2013; Yan, 2009). Rather than the Hofstede overall index, Dikova et al. (2010) took two dimensions: Power Distance and Uncertainty Avoidance to depict culture and found that both had adverse effects on cross-border M&A completion. Kristjnsdttir et al. (2017) explored five Hofstede dimensions and found only Masculinity had a significant positive impact on bilateral trade flows. Buckley et al. (2007) introduced yet another cultural variable of whether Asians exceeded 1% of total national population to represent cultural similarity. The empirical results revealed that cultural resemblance was positively related to China's outward foreign direct investment (OFDI). Ahern et al. (2012) combined language, religion, geographic distance as well as Hofstede and Schwartz indices and studied their joint effects on method of payment and deal volume of cross-border M&As.

Since we are studying cross-border M&As, there are various factors that affect outcomes of deals and need to be controlled for in the analysis. We can categorize them into macroeconomic influences, industry-specific characteristics and firm-level deal heterogeneities. As is widely accepted in international trade study with the gravity model, host and home country GDP, geographic distance, common border (or contiguity) and regional trade agreements (RTA) are usually introduced as control variables (Bergstrand, 1985; Baier and Bergstrand, 2009; Feenstra, 2002; Anderson and Wincoop, 2003; Head and Ries, 2008). One of the main incentives of cross-border M&As is to acquire cutting-edge technologies and scarce natural resources (Mariotti and Piscitello, 1995). Yet targets in high-tech and resource industries are sensitive to foreign acquisitions and deals are often restricted by host countries (Yan, 2011). Acquiring a target of the same industry will probably improve the success rate of transaction and beneficial to performance after the deal (Zhang and Zhou, 2010). At firm level, the acquirer's ownership structure (Zhang and Zhou, 2010; Jia et al., 2015), cross-border M&A experience (Jia and Li, 2015), method of payment and percentage acquired have potential influences on the completion and transaction value as well (Zhao and Li, 2008; Dikova et al., 2010; Hu and Wu, 2011).

One of the most closely related literature to our work is Melitz and Toubal (2014). The data of common official language, common spoken language and common native language are originally developed by them. Both our paper and their work adopt the gravity model. However, there are some main differences. First, the question of interest in our paper is China's cross-border M&As while Melitz and Toubal (2014) focused on bilateral trade. Second, we examine M&A performance from different aspects such as deal value, number and success rate with different estimation methods, whereas Melitz and Toubal (2014) based all their analysis on the gravity model to study the effect of language on international trade volume. Third, one of their main contributions is providing a new set of detailed language data and much effort was made in explaining the validity of these measurements. In our work, we take this set of indices and introduce it into cross-border M&A studies. In terms of the results, we do find significant influence of detailed language features on China's cross-border M&As, which resembles their findings in trade.

3 Model setup

To obtain a comprehensive understanding of the impacts of culture and language, we examine China's cross-border M&As from three perspectives: the total deal values, the number of transactions and the success rate of individual transactions.

3.1 Gravity model for deal value

Based on the Newtonian gravity equation of attractive force between two objects, Tinbergen (1962) first proposed an analogous function that could be applied to international trade flows. Since then, it has been widely applied to imports and exports analysis between different countries. Here we take the following econometric form of the gravity model:

$$\begin{aligned}\log Value_{jt} =& \alpha_0 + \alpha_1 COL_{jt} + \alpha_2 CSL_{jt} + \alpha_3 CNL_{jt} \\ &+ \alpha_4 Confucian_{jt} + \alpha_5 CD_{jt} + \alpha_6 \log GDP_{jt} + \alpha_7 \log CGDP_t \\ &+ \alpha_8 \log Dist_{jt} + \alpha_9 Contig_{jt} + \alpha_{10} RTA_{jt} + \alpha_{11} GCI_{jt} \\ &+ \delta_k + \mu_t + \varepsilon_{kjt}\end{aligned} \tag{1}$$

where $Value_{jt}$ is the cross-border M&A deal value from China to country j in year t. α_0 is the constant term. $\alpha_i, i = 1, ..., 11$ are coefficients of language, cultural and other country-level control variables. δ_k and μ_t represent industry and year fix effects. ε_{kjt} is the error term. COL, CSL and CNL are common official language, common spoken language and common native language indicators respectively. COL is the binary measure of common official language between two countries. The original data is taken from the *Central Intelligence Agency (CIA) World Factbook*. CNL is the probability that a pair of people randomly chosen from two countries share the same native language. CSL is the 0 to 1 probability that a pair of people randomly chosen from two countries understand one another in a certain spoken language. For example, the Chinese dialects include Mandarin, Cantonese, Min Nan, Wu, Yue, and Hakka, etc. Due to historical reasons, migrants from China to other countries have now integrated to the local culture but their original Chinese dialects are reserved as part of their daily language. This is the case with Singapore, Malaysia and some other Asian countries as well. Data on the last two indicators come from the *Special Eurobarometer* survey adjusted by population share and verified by *Ethnologue*. More detailed constructions of the variables are described in Melitz and Toubal (2014). Here we rescaled the sample so that the language indicators range from 0 to 1 so that we can compare the magnitude of impacts across different measures.

As for culture, $Confucian$ differentiates whether the host country is in the Confucian cultural circle defined after Ye et al. (2012) . CD_j is the Hofstede cultural distance between China and the host country. Following Kought and Singh (1988),

$$CD_j = \sum_{n=1}^{6} \left\{ (I_{nj} - I_{nc})^2 / V_n \right\} / 6 \tag{2}$$

where I_{nj} is the index of country j in dimension n, I_{nc} is the index of China in dimension n and V_n is the variance of all countries in dimension n. logGDP and log$CGDP$ are host country and China's GDP in log, respectively. We introduce these indices to control for the economic development levels of the host and home countries. Following the standard gravity model structure, log$Dist$ represents the population-weighted distance between home and host countries. Normally, we assume adjacent countries are more likely to share some language similarity. $Contig$ here represents the contiguity or adjacency of home and host countries. If the country pair shares a common border, $Contig$ equals 1, otherwise, $Contig$ equals 0. RTA is the regional trade agreement dummy. GCI is short for Global Competitive Index, which integrates the macroeconomic and the micro/business aspects of competitiveness such as institutions, policies and local markets into a single index to capture country-specific features as a control variable.

3.2 Poisson model for deal number

Besides total deal values, we would also like to learn the response of deal numbers to language and culture. Since the dependent variable is non-negative and takes integer values, the proper estimation of deal numbers is the Poisson regression (Head and Ries, 2008). Therefore, the identification equation is:

$$\begin{aligned} E(Number|\boldsymbol{X}) =& exp(\boldsymbol{X'\beta}) = exp(\beta_1 COL + \beta_2 CSL + \beta_3 CNL \\ &+ \beta_4 Confucian + \beta_5 CD + \beta_6 \text{log}GDP + \beta_7 \text{log}CGDP \\ &+ \beta_8 \text{log}Dist + \beta_9 Contig + \beta_{10} RTA + \beta_{11} GCI \\ &+ \beta_{12} Industry + \beta_{13} Year + Constant) \end{aligned} \tag{3}$$

where $Number$ is the aggregate number of cross-border M&A deals in a certain host country in a certain year. $Industry$ and $Year$ are industry and year fixed-effect dummies. All the other explanatory variables have the same definitions as in the gravity equation.

3.3 Logit model for deal success rate

Now we examine the single transaction outcomes. Summary statistics from the Zephyr M&A database show that among all China's cross-border M&A deals announced, only 66.4% reach the final stage when stakeholders actually sign for transaction. Therefore, it is worthwhile to investigate the determinants of China's cross-border M&A success rate. Since the dependent variable of interest here is binary, we adopt a Logit model to examine the deal outcome effects.

$$P_d = E(Y_d = 1) = \frac{1}{1 + e^{-(\theta_0 + \theta_1 X_d + \theta_2 Z_d + \epsilon_d)}} \tag{4}$$

As is shown in equation (4), P_d is the probability that a firm successfully completes the cross-border M&A deal d, Y_d denotes whether the deal is successful and takes the value of 0 or 1, X_d represents the explanatory variables, including language and cultural indicators as mentioned before and Z_d represents the control variables, which entails deal-level features including cash payment dummy $Cash$, cross-border M&A experiences Exp, the acquirer ownership dummy SOE and acquired company shares $Stake$. ϵ_d is the error term, $d = 1, 2, 3, ..., n$. All variable definitions are shown in Table 1.

Table 1. Variable definition.

Dependent variable	
log$Value$	Log of deal value (2005 constant USD) in each host country per year.
$Number$	Number of deals in each host country per year.
$Deal$	Status of deal outcome. 1=completed/completed assumed, 0=otherwise.[1]
Independent variable	
Language	
COL	Common official language index.
CSL	Common spoken language index.
CNL	Common native language index.
$Confucian$	1=Host country is under Confucian influence, 0=otherwise.[2]
CD	The Hofstede cultural difference index.
Country-level	
logGDP	Log of host country GDP (2005 constant USD in billions).
log$CGDP$	Log of China's GDP (2005 constant USD in billions).
log$Dist$	Log of population weighted distance between home and host countries (kilometers).
$Contig$	1=Contiguity between China and the host country, 0=otherwise.
RTA	1=Host and home countries are within the same regional trade agreement (source: WTO, 2015), 0=otherwise.
GCI	Global competitive index.
Deal-level	
$Cash$	1=Cash payment, 0=non-cash payment.
Exp	Former cross-border M&A experiences of the acquirer.
SOE	1=The acquirer is a state-owned enterprise, 0=otherwise.
$Stake$	Stake acquired of the target firm.

[1] The other deal status are announced, rumour, pending and withdrawn.
[2] The host countries under Confucian influence are Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Thailand and Vietnam.

Among the variables, COL, CSL and CNL are provided by Melitz and Toubal (2014) and available from CEPII (the French *Centre d'Etudes Prospectives et d'Informations Internationales*) website. GDP and $CGDP$ are taken from BvD EIU Country Data, $Contig$ and RTA are also obtained from CEPII online database. GCI is extracted from the Global Competitiveness Reports. PDI, IDV, MAS, UAI, LTO, IND were extracted from the Hofstede Insights online data, where each indicator is scaled from 0-100. We then calculated CD as the cultural difference between host and home countries using equation (2). $Value$, $Cash$, Exp, SOE, $Stake$ were originally from BvD Zephyr global M&A database.

4 Descriptive statistics

We combine the deal values of the same host country each year to set up host country-year panel data. The data time span ranges from 1997 to 2017 and covers 126 host countries globally (see Appendix Table A1). To measure the net effects on cross-border M&As, we exclude deals in Hong Kong, Macao and Taiwan. Also, investment to tax havens is typically aimed at assets transfer. Therefore, we follow previous literature and exclude deals in Bermuda, British Virgin Islands and Cayman Islands. The summary statistics are shown in Table 2.

Table 2. Summary statistics.

Variable	Mean	Std. Dev.	Min	Max
Dependent variable				
log$Value$	13.407	8.463	0	25.531
$Number$	4.497	8.947	1	122
$Deal$	0.669	0.471	0	1
Independent variable				
Language				
COL	0.025	0.155	0	1
CSL	0.038	0.161	0	1
CNL	0.036	0.166	0	1
Cultural				
$Confucian$	0.156	0.363	0	1
CD	2.468	1.073	0.500	4.804
Country-level				
logGDP	5.322	1.950	0.693	9.663
log$CGDP$	8.316	0.398	7.048	8.791
log$Dist$	8.862	0.592	7.064	9.858
$Contig$	0.121	0.327	0	1
RTA	0.148	0.355	0	1
GCI	4.729	0.673	2.890	5.860
Deal-level				
$Cash$	0.455	0.498	0	1
Exp	2.015	4.675	0	40
SOE	0.160	0.367	0	1
$Stake$	0.508	0.431	0	1

Before regression, we first examine the correlations between the main explanatory variables as shown in Table 3. According to Table 3, the language variables are strongly and positively correlated (above 0.9). $Confucian$ is moderately correlated with language variables and CD has negative relations with other variables. To mitigate possible collinearity problems, we introduce the main explanatory variables of interest one by one in the following regressions.

Table 3. Language variable correlations.

	COL	CSL	CNL	$Confucian$	CD
COL	1				
CSL	0.948	1			
CNL	0.924	0.997	1		
$Confucian$	0.362	0.446	0.462	1	
CD	-0.316	-0.345	-0.362	-0.580	1

All the correlations are significant at the 1% level.

5 Estimation results

5.1 Deal value

In accordance with the model setup, we first estimate the effects of language and culture on cross-border M&A deal values. We use OLS estimations as our baseline regressions with the panel data. We do not adopt fixed effect estimates because it will wipe out time-invariant country characters including the languages and national culture we would like to examine. Instead, we control a series of country-specific features to pick up intrinsic factors related to a specific country.

Table 4 shows the baseline results of the gravity model on cross-border M&A deal value. Columns (1) to (3) show the influence of language on cross-border M&As. We find that the language variable coefficients are all positive and significant, showing that common languages have positive effects on China's cross-border M&A deal values.

Columns (4) and (5) provide estimates of cultural factors. The results show that if the host country is

in the Confucian cultural circle, the cross-border M&A deal value is likely to be larger than in other host countries, though not statistically significant. The estimated coefficients of Hofstede cultural distance is negative but not significant either.

Table 4. Gravity model. Dependent variable: log$Value$.

	(1)	(2)	(3)	(4)	(5)
COL	1.616***				
	(0.486)				
CSL		1.412**			
		(0.647)			
CNL			1.279*		
			(0.702)		
$Confucian$				0.406	
				(1.023)	
CD					-0.073
					(0.231)
log$CGDP$	2.136***	2.149***	2.142***	1.867***	1.916***
	(0.629)	(0.631)	(0.631)	(0.610)	(0.651)
logGDP	0.629***	0.626***	0.622***	0.583***	0.601***
	(0.130)	(0.132)	(0.132)	(0.130)	(0.154)
log$Dist$	1.041**	1.054**	1.059**	1.264*	1.021*
	(0.478)	(0.489)	(0.490)	(0.738)	(0.562)
$Contig$	1.406**	1.442**	1.444**	1.475*	1.184*
	(0.594)	(0.608)	(0.610)	(0.816)	(0.615)
RTA	-0.536	-0.567	-0.557	-0.428	-0.464
	(0.415)	(0.428)	(0.424)	(0.645)	(0.455)
GCI	0.215	0.219	0.241	0.455	0.483
	(0.415)	(0.422)	(0.420)	(0.410)	(0.427)
$Constant$	-12.348*	-12.577*	-12.636*	-13.086	-11.118
	(7.243)	(7.302)	(7.311)	(8.490)	(7.699)
Observations	322	322	322	325	297
R^2	0.357	0.355	0.354	0.359	0.349

Robust standard errors in parentheses, clustered by host country.

Year and industry fixed effects are controlled. [3]

*** p<0.01, ** p<0.05, * p<0.1

One concern with the baseline results is that cross-border M&As are not randomly allocated among host countries. It is possible that countries with certain characteristics will be more likely to attract foreign investment so that the self-selection into transactions may cause bias in estimated results. To deal with the problem, we adopt the Heckman two-stage estimation method originally proposed by Heckman (1979) and later developed by Helpman et al. (2008) in the field of international trade. In the first stage, a Probit equation is estimated with the country-specific features to account for the probability of being selected into cross-border M&As. In the second stage, an OLS estimation is carried out on the control variables together with inverse Mill's ratio obtained from the first stage to adjust for selection bias. The results are shown in Column (2) of Table 5. The control variables are in accordance with former regressions and are henceforth omitted in discussion for brevity. Compared to the baseline OLS estimation, the coefficients of Heckman two-stage estimates are larger in magnitude after controlling for selection bias, but still show consistent positive influence of language on deal values. The effects of Confucian and Hofstede cultural distance are positive and negative respectively but again with no significance statistically.

Another source of bias comes from the nature of the time-invariance of the language and culture variables which are the main explanatory variables of interest we would like to examine. Here we introduce the system GMM estimation in a dynamic panel (see Arellano and Bond, 1991 and Holtz-Eakin

[3]According to the Zephyr database classification, the industries are divided into 19 categories, namely banks; chemicals, rubber, plastics, non-metallic products; construction; education, health; food, beverages, tobacco; gas, water, electricity; hotels and restaurants; insurance companies; machinery, equipment, furniture, recycling; metals and metal products; other services; post and telecommunications; primary sector (agriculture, mining, etc.); public administration and defense; publishing, printing; textiles, wearing apparel, leather; transport; wholesale and retail trade; wood, cork, paper.

et al., 1988) to solve this issue. We take one period lags in the time-varying components of the control variables, namely, the host and home country GDPs and the global competitive index (GCI) of the host countries as endogenous instruments, using the year and industry dummies as exogenous instruments and run the system GMM estimates. The regression results are in Column (3) of Table 5. We can see that the coefficients are very similar to those from the Heckman two-stage estimates and again confirm our main findings.

Table 5. Gravity model. Dependent variable: log$Value$.

	OLS	Heckman two-stage	system GMM	PPML
	(1)	(2)	(3)	(4)
COL	1.616***	3.595*	3.525***	1.416***
	(0.486)	(2.170)	(1.214)	(0.469)
Observations	322	459	323	450
CSL	1.412**	3.800*	3.364***	1.865***
	(0.647)	(2.257)	(1.285)	(0.552)
Observations	322	459	323	450
CNL	1.279*	3.671*	3.190**	1.853***
	(0.702)	(2.220)	(1.276)	(0.589)
Observations	322	459	323	450
$Confucian$	0.406	1.934	2.084	-0.803
	(1.023)	(1.583)	(1.467)	(1.222)
Observations	325	463	326	453
CD	-0.073	-0.054	-0.417	0.084
	(0.231)	(0.372)	(0.380)	(0.254)
Observations	297	415	298	407

All regressions control for host and home country GDP (in logarithm), distance (in logarithm), contiguity, regional trade agreement, and global competitiveness.

Year and industry fixed effects are controlled.

Robust standard errors in parentheses, clustered by host country.

*** p<0.01, ** p<0.05, * p<0.1

In consideration of zero transaction volume in bilateral M&As as is often discussed in international trade, we also report the PPML estimate to address possible bias from zeros following Santos Silva and Tenreyro (2006). According to column (5) in Table 5, the language variables have positive coefficients. The estimators are statistically significant at the 1% level for all language indicators. For cultural measures, we still do not find significance in the coefficients. Overall, the PPML estimates agree with our previous findings with other estimation methods and therefore verify the conclusions.

5.2 Deal number

To further test our findings, we introduce the Poisson model to examine the relationship between China's cross-border deal numbers and similarity in language and culture. Table 6 shows the basic results. Similar to the gravity model, we find that the coefficients of COL, CSL and CNL are significantly positive. The effects of national culture are still insignificant, which is in line with former results. The regression outcome reveals that in terms of cross-border M&A deal numbers, COL, CSL and CNL still work as evident driving forces.

Table 6. Poisson model. Dependent variable: $Number$.

	(1)	(2)	(3)	(4)	(5)
COL	1.282***				
	(0.144)				
CSL		1.460***			
		(0.250)			
CNL			1.471***		
			(0.279)		
$Confucian$				0.455	
				(0.514)	
CD					0.027
					(0.205)
log$CGDP$	1.567***	1.568***	1.559***	1.537***	1.573***
	(0.403)	(0.400)	(0.397)	(0.407)	(0.430)
logGDP	0.373***	0.379***	0.379***	0.308***	0.370***
	(0.045)	(0.045)	(0.045)	(0.061)	(0.067)
log$Dist$	0.209	0.218	0.227	0.430	0.184
	(0.140)	(0.143)	(0.144)	(0.295)	(0.225)
$Contig$	0.142	0.16	0.167	0.326	0.105
	(0.208)	(0.214)	(0.216)	(0.321)	(0.173)
RTA	-0.283*	-0.400*	-0.426*	-0.181	0.176
	(0.152)	(0.207)	(0.230)	(0.250)	(0.216)
GCI	0.375***	0.343***	0.351***	0.586***	0.517*
	(0.129)	(0.127)	(0.127)	(0.191)	(0.269)
$Constant$	-18.01***	-17.97***	-18.00***	-20.43***	-18.70***
	(3.679)	(3.641)	(3.626)	(3.896)	(3.658)
Observations	459	459	459	462	414
R^2	0.401	0.404	0.405	0.383	0.387

Robust standard errors in parentheses, clustered by host country.
Year and industry fixed effects are controlled.
*** p<0.01, ** p<0.05, * p<0.1

Again, we adopt the negative binomial regression as an alternative of poisson regression to check the robustness of our findings regarding deal numbers. Table 7 shows that the results conform with those in Table 6. We can safely conclude that in terms of deal numbers, language dimensions are significantly associated with the increase of China's cross-border M&As.

Table 7. Negative binomial regressions. Dependent variable: $Number$.

	(1)	(2)	(3)	(4)	(5)
COL	1.255***				
	(0.152)				
CSL		1.335***			
		(0.197)			
CNL			1.305***		
			(0.223)		
$Confucian$				0.524	
				(0.357)	
CD					-0.002
					(0.139)
log$CGDP$	1.102***	1.097***	1.090***	1.082***	1.080***
	(0.120)	(0.121)	(0.120)	(0.128)	(0.156)
logGDP	0.296***	0.300***	0.299***	0.238***	0.308***
	(0.041)	(0.041)	(0.041)	(0.048)	(0.057)
log$Dist$	0.100	0.111	0.117	0.344*	0.0978
	(0.099)	(0.102)	(0.103)	(0.204)	(0.166)
$Contig$	0.162	0.188	0.194	0.356	0.124
	(0.198)	(0.207)	(0.209)	(0.220)	(0.190)
RTA	-0.373***	-0.441**	-0.448**	-0.369*	0.000161
	(0.140)	(0.171)	(0.177)	(0.190)	(0.182)
GCI	0.446***	0.420***	0.428***	0.644***	0.595***
	(0.135)	(0.132)	(0.130)	(0.165)	(0.198)
$Constant$	-12.65***	-12.61***	-12.63***	-15.34***	-13.45***
	(1.536)	(1.542)	(1.546)	(2.173)	(2.003)
Observations	453	453	453	456	408
R^2	0.177	0.178	0.178	0.167	0.164

Robust standard errors in parentheses, clustered by host country.
Year and industry fixed effects are controlled.
*** p<0.01, ** p<0.05, * p<0.1

5.3 Success rate

We have examined the effects of language and culture on cross-border M&A deal values and deal numbers. Next we look at their influence on the success rate of Chinese firms' cross-border M&A transactions. Instead of gravity variables, we introduce deal-level indicators to measure performances. The first five columns of Table 8 are Logit regression results and the last five are Probit regression results. We can tell from the table that the estimators of language indices are stably consistent with the first two models. All language variables are significantly positive at the 1% significance level, though Probit regression coefficients are smaller than those of Logit regressions. These results serve as strong evidence that language plays an important role in China's cross-border M&A investment.

Deal-level variables reveal some detailed insights during cross-border transactions. We find that the coefficient of $Cash$ is significantly positive. This indicates that if the cross-border M&A deal is paid in cash, the deal value is significantly raised up. Compared to stock payment, cash payment is faster and the risks are reduced therefore it is often preferred as favorable terms to the seller. The coefficients of Exp^2 are positive and the coefficients of Exp are negative, indicating a "U" shape relationship between experience and the success rate of cross-border M&As. This means at the beginning of globalization, firms may witness a decreasing marginal effect of experience when they are not familiar with foreign business environments. However, once they surpass a certain threshold, international experience may help firms successfully close the deals when they have accumulated enough expertise to adapt to new situations. If the acquirer is a state-owned enterprise, the possibility of finishing the deal with success will drop. This makes sense because SOEs are often equipped with abundant source of capital and backed up by strong political support to carry out mega deals abroad. The acquired firms and host countries are more cautious when facing SOE acquirers, taking national security and industry competition into consideration. The influence of stake acquired is consistently negative though not statistically significant. Therefore, we can only infer that the bigger stake acquired might lead to lower success rate. Finally, we do not find significant cultural influences on the success rate of cross-border M&A deals.

Table 8. Language. Dependent variable: $Deal$.

	Logit					Probit				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
COL	0.731***					0.422***				
	(0.080)					(0.045)				
CSL		0.791***					0.456***			
		(0.092)					(0.049)			
CNL			0.787***					0.454***		
			(0.090)					(0.048)		
$Confucian$				0.087					0.052	
				(0.223)					(0.132)	
CD					0.023					0.013
					(0.080)					(0.048)
$Cash$	0.400***	0.393***	0.392***	0.428***	0.389***	0.245***	0.241***	0.240***	0.264***	0.240***
	(0.106)	(0.106)	(0.106)	(0.107)	(0.098)	(0.064)	(0.064)	(0.064)	(0.064)	(0.058)
Exp	-0.038	-0.038	-0.038	-0.044	-0.039	-0.023	-0.023	-0.023	-0.027*	-0.024
	(0.027)	(0.027)	(0.027)	(0.027)	(0.028)	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)
Exp^2	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SOE	-0.281	-0.28	-0.281	-0.275	-0.323	-0.174	-0.173	-0.174	-0.17	-0.198
	(0.197)	(0.197)	(0.197)	(0.197)	(0.207)	(0.118)	(0.118)	(0.118)	(0.118)	(0.124)
$Stake$	-0.019	-0.017	-0.017	-0.017	-0.045	-0.019	-0.018	-0.019	-0.017	-0.035
	(0.182)	(0.181)	(0.181)	(0.182)	(0.191)	(0.107)	(0.107)	(0.106)	(0.107)	(0.112)
$Constant$	-0.749**	-0.755**	-0.751**	-0.735**	-0.634	-0.448**	-0.451**	-0.449**	-0.440**	-0.38
	(0.356)	(0.355)	(0.355)	(0.356)	(0.421)	(0.211)	(0.211)	(0.210)	(0.211)	(0.251)
Observations	2837	2837	2837	2867	2702	2837	2837	2837	2867	2702
χ^2	-	1012	1143	598	844	-	1086	1211	644	918
p value	-	0.000	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000
R^2	0.0580	0.0585	0.0586	0.0549	0.0544	0.0584	0.0590	0.0591	0.0555	0.0549

Robust standard errors in parentheses, clustered by host country.
Year and industry fixed effects are controlled.
*** p<0.01, ** p<0.05, * p<0.1

6 Additional analysis

Cross-border M&As are driven by different motives such as market expansion, technology upgrading and resource searching. Therefore, we expect heterogeneities across destination countries and industries as well. First, we explore the differences between developing and developed M&A investment destinations. According to Table 9, the first two columns show the estimations of OLS regressions, the next two columns report the results of Poisson regressions and the last two columns display Logit regression outcomes. Unfortunately, in the developing countries sample, the estimators of COL are automatically omitted because of missing values. Therefore, we are not able to estimate the difference between country groups. However, when we examine the coefficients of CSL and CNL, we find more significant impacts of language in the sample for developed countries than in the sample for developing countries. The discovery holds consistent with deal value and deal number while for success rate, language seems to exert a slightly larger positive effect on developing countries. Yet we cannot draw the same conclusions regarding national culture.

To understand the variation, we may refer to the fact that developed countries have stricter and more transparent institutional environments for business transactions. In contrast, in developing countries there are more likely to be local conventions that interfere with deal processes. Regulations might not be observed strictly while corruptions and bribery are more likely to take place which sabotage the procedures of commercial activities. While in developed countries with better institutional background, language similarity provides better understanding between buyers and sellers. Common spoken language helps with mutual understanding that smooths the deals and common native language boosts trust between different parties which is also beneficial to transactions.

Table 9. Destination heterogeneities.

	OLS		Poisson		Logit	
	Developed	Developing	Developed	Developing	Developed	Developing
	(1)	(2)	(3)	(4)	(5)	(6)
COL	2.496*		2.279***		0.755***	
	(1.257)		(0.217)		(0.080)	
Observations	152		193		1959	
CSL	2.651**	8.705	2.612***	-0.596	0.794***	1.017***
	(1.279)	(6.032)	(0.394)	(0.531)	(0.085)	(0.383)
Observations	152	257	193	257	1959	861
CNL	2.653**	6.552	2.681***	-0.620	0.797***	0.818***
	(1.262)	(4.689)	(0.469)	(0.434)	(0.089)	(0.297)
Observations	152	257	193	257	1959	861
$Confucian$	1.789	2.721	2.078**	0.499*	0.280	-0.140
	(2.407)	(2.543)	(0.833)	(0.265)	(0.288)	(0.231)
Observations	152	260	193	260	1959	891
CD	-0.152	-0.515	0.024	-0.110	-0.095	0.175*
	(0.300)	(0.935)	(0.198)	(0.107)	(0.084)	(0.090)
Observations	149	216	189	216	1949	741

All regressions control year and industry fixed effects.
Columns (1) to (4) control host and home country GDP (in logarithm), distance (in logarithm), contiguity, regional trade agreement, and global competitiveness.
Columns (5) and (6) control cash payment, experience, dummy for state-owned enterprise and stake acquired.
Robust standard errors in parentheses, clustered by host country.
*** p<0.01, ** p<0.05, * p<0.1

Next, we turn to look at the outcomes of different industries. We look at the manufacturing industries [4] and the service industries [5] respectively. More detailed industries are not examined because of limited sample size. For deal values, common languages have significant positive effects in the manufacturing industries but no significant effect in the service industry. In the aspect of deal number, the importance of languages is significant for both manufacturing and service industries but the effects are still larger in the manufacturing sectors. Here the Confucian cultural tradition is significant in explaining the number of deals, too. For the success rate, however, the situation reverts that only in the service sectors do we observe significant effects in the outcome while there is no evident effect in the manufacturing sectors. All through these estimations, the influences of Hofstede cultural distance are mostly negative but not strong enough to draw robust conclusions.

[4]NAICS2017 two-digit industry classification codes 31-33.
[5]NAICS2017 two-digit industry classification codes 22 and 42-81.

Table 10. Industry heterogeneities.

	OLS		Poisson		Logit	
	Manufacturing	Service	Manufacturing	Service	Manufacturing	Service
	(1)	(2)	(3)	(4)	(5)	(6)
COL	1.446***	0.795	1.563***	1.277***	0.184	0.926***
	(0.509)	(1.000)	(0.236)	(0.213)	(0.117)	(0.076)
Observations	126	115	165	168	1066	1197
CSL	1.863**	1.303	1.588***	1.358***	0.177	0.955***
	(0.722)	(1.081)	(0.343)	(0.219)	(0.132)	(0.080)
Observations	126	115	165	168	1066	1197
CNL	1.848**	1.347	1.461***	1.351***	0.146	0.943***
	(0.745)	(1.085)	(0.387)	(0.215)	(0.139)	(0.078)
Observations	126	115	165	168	1066	1197
$Confucian$	1.021	0.332	1.148**	1.043***	-0.189	0.362
	(1.804)	(1.536)	(0.458)	(0.382)	(0.228)	(0.275)
Observations	126	116	165	169	1072	1213
CD	0.116	-0.198	-0.143	-0.083	0.130**	-0.119
	(0.304)	(0.271)	(0.092)	(0.126)	(0.061)	(0.094)
Observations	123	108	197	154	1031	1160

All regressions control year and industry fixed effects.
Columns (1) to (4) control host and home country GDP (in logarithm), distance (in logarithm), contiguity, regional trade agreement, and global competitiveness.
Columns (5) and (6) control cash payment, experience, dummy for state-owned enterprise and stake acquired.
Robust standard errors in parentheses, clustered by host country.
*** p<0.01, ** p<0.05, * p<0.1

7 Conclusions and discussions

This paper analyses the impacts of common language and cultural background on China's cross-border M&As. We examine their influence from three aspects: the total deal value, the number of deals and the success rate of individual transactions. We borrow the widely-accepted gravity model in international trade and conduct a series of alternative estimates to support our findings.

Instead of a simplistic common language dummy, we take different perspectives of language including common official language, common spoken language and common native language to capture different channels through which national language may affect cross-border M&As. We find significant positive effects of aggregate linguistic factors on China's outward M&A investment. Besides official support, ease of communication through translation and interpreters, together with ethnicity and trust contribute to cross-border M&As substantially.

More broadly speaking, national culture plays a fundamental role in international commerce. The Hofstede cultural dimensions are chosen to capture national culture differences. Particular to the circumstance of China, we introduce the Confucian indicator to learn how religion and conventional beliefs affect overseas investment. Yet we find very weak evidence of cultural influence on China's cross-border M&A investments. Subsample comparisons show that common spoken language and common native language are more important in developed countries than in developing countries in terms of deal value and number while success rate is higher in developing countries instead. As for industry heterogeneities, a similar pattern is found that language similarities have bigger influence in the manufacturing industries rather than in the service industries in terms of deal value and number. But the service industries enjoy a higher success rate relative to the manufacturing industries.

Our conclusions may offer useful implications to cross-border M&A practitioners. Various evidences have shown the importance of language in international transactions, especially in M&A deals when negotiation and communication are vital to the outcome. Language and cultural similarities may help with the deal process greatly based on mutual understanding and alleviated hostility. Also, people participating in the business should bear in mind that mutual understanding and trust boost understanding and cooperation that lead to rational and wise investment decisions in cross-border M&As. For policy makers, the importance of language education and training should be emphasized. The proficiency of lingua franca not only improves communication and mutual understanding, but also brings economic benefits at least through cross-border investments.

In terms of future research, extensions may be stretched to broader geographic regions that involve multilateral investments and more variance in languages and national cultures. Other macroeconomic features could also be taken into consideration to improve the explanation power of the dependent variables.

Appendix

Table A1. Host countries.

Albania	French Polynesia	Pakistan
Angola	Gabon	Panama
Argentina	Georgia	Papua New Guinea
Armenia	Germany	Peru
Australia	Ghana	Philippines
Austria	Greece	Poland
Azerbaijan	Guinea	Portugal
Bangladesh	Guyana	Republic of Korea
Barbados	Honduras	Romania
Belarus	Hungary	Russian Federation
Belgium	Iceland	Samoa
Bolivia	India	Saudi Arabia
Bosnia and Herzegovina	Indonesia	Serbia
Brazil	Iran	Seychelles
Brunei Darussalam	Iraq	Sierra Leone
Bulgaria	Ireland	Singapore
Burma	Israel	Slovakia
Cambodia	Italy	Slovenia
Cameroon	Jamaica	South Africa
Canada	Japan	Spain
Cape Verde	Jordan	Sri Lanka
Central African Republic	Kazakhstan	Sweden
Chad	Kenya	Switzerland
Chile	Kyrgyzstan	Syrian Arab Republic
Colombia	Lao People's Republic	Tajikistan
Congo	Liberia	Tanzania
Cook Islands	Lithuania	Thailand
Costa Rica	Luxembourg	Trinidad and Tobago
Croatia	Macedonia	Turkey
Cuba	Malaysia	Turkmenistan
Cyprus	Maldives	Uganda
Czech Republic	Malta	Ukraine
Democratic Republic of Congo	Mauritius	United Arab Emirates
Denmark	Mexico	United Kingdom
Ecuador	Mongolia	United States of America
Egypt	Mozambique	Uruguay
El Salvador	Namibia	Uzbekistan
Eritrea	Netherlands	Vanuatu
Estonia	New Zealand	Venezuela
Ethiopia	Nigeria	Viet Nam
Finland	Norway	Zambia
France	Oman	Zimbabwe

Table A2. The language data

Rank	Index	Country	No. of deals
	COL		
1	1	Singapore	170
	CSL		
1	1	Singapore	170
2	0.3532	Malaysia	41
3	0.0548	Australia	273
4	0.0151	UK	162
	0.0151	Barbados	2
5	0.0150	Thailand	29
		New Zealand	22
		Ireland	8
		Jamaica	6
6	0.0147	US	516
7	0.0139	Guyana	2
8	0.0136	Sweden	26
		Norway	13
		Iceland	2
9	0.0135	Malta	1
		Trinidad and Tobago	1
10	0.0133	Netherlands	66
	CNL		
1	1	Singapore	170
2	0.4318	Malaysia	41
3	0.0682	Australia	273

Notes: For COL, only Singapore has the same official language with China. For CSL and CNL, the original dataset records percentage of population who use the language $\geq 4\%$. Here we list the countries with the highest 10 values of CSL index and 3 countries with positive CNL.

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