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Corporate culture and firm resilience in China: Evidence from the Sino-US trade war

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ABSTRACT

Prior literature shows that corporate culture matters for firm performance and enhance corporate resilience in crises. We construct a text-based measure of corporate culture for Chinese listed firms and study whether and how strong corporate culture improves corporate resilience during the Sino-US trade war. Empirical analyses suggest that a strong corporate culture mitigates the deteriorating stock returns due to the trade war exposure through two potential influencing mechanisms, enhancing operating performance and mitigating financial constraint. Results also indicate that strong culture works more effectively for privately owned enterprises (POEs) than their state-owned peers, and individual cultures of innovation, hardworking, teamwork, and quality have material effects on stock performance of the POEs. The evidence pinpoints that strong corporate culture helps insulate Chinese private firms more from external shocks and achieve a more sustainable growth.

1. Introduction

The United Nations has adopted 17 Sustainable Development Goals (SDGs)[1] with 169 targets, including reducing poverty and inequality between countries, providing jobs for higher living standards and sustainable economic growth, and revitalizing strong global partnerships for sustainable development. Research has demonstrated that international commerce is connected to the sustainable advancement of economies (Chen et al., 2009; Bonfatti, 2017; Wang et al., 2017; Xu et al., 2020).

However, certain anti-globalization events have detrimentally affected the economic growth of developing nations in a sustainable manner. The Sino-US trade war started in late 2017 when the former US president, Donald Trump, launched the Section 301 investigation on China. The investigation quickly deteriorated into a trade war, with both countries imposing protectionist policies such as increased trade barriers and tariffs against each other. The unexpected and abrupt rise of trade barriers and disruptions put a heavy toll on the Chinese economy. The Sino-US trade war is one of China's most serious economic challenges in recent years. In 2018, the first year of this event, the Shanghai Stock Exchange Composite Index, one of the Chinese stock markets, suffered a 32% loss, from 3587 to 2441 points.

Given the extraordinary nature of the trade war between the two largest economies in the world, it becomes imperative to study

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[1] The 17 Sustainable Development Goals are adopted by all United Nations Member States in 2015. https://unric.org/en/united-nations-sustainable-development-goals/

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whether corporate culture enhances firms' resilience against external adversities. Corporate culture is one of the most important factors determining value creation and thus the ultimate business success of a firm (Graham et al., 2022). Kreps (1990) defines corporate culture as an intangible asset designed to meet unforeseen contingencies. Corporate culture is the bottom line that firms build over time for survival and competitive advantage. The important survey paper by Graham et al. (2022) of CEOs and CFOs across a wide range of US firms finds that corporate culture is an important value driver of firms and improving corporate culture can add value to firms.

A major empirical challenge raised by Graham et al. (2022) is how to adequately measure corporate culture using publicly available data. They suggest conference call transcripts and independent datasets as potential sources for empirically measuring corporate culture. Following their suggestion, Li et al. (2021b) construct firm-level corporate culture using a machine-learning approach. Li et al. (2021a) find that the stocks of US firms with strong corporate cultures outperform their counterparts with weak cultures during the Covid-19 pandemic.

Inspired by Graham et al.'s (2022)) survey results and following the method introduced by Li et al. (2021a, 2021b), we first identify the most frequently mentioned corporate culture values among listed firms in China: integrity and honesty, innovation and technology, hardworking and performance, product and service quality, and teamwork and cooperation, to be the starting point for us to measure corporate culture. We identify these values by hand-collecting the corporate value content from 2818 corporate websites and clustering the terms into value topics using the K-Means algorithm. We then score these five corporate culture values. To do so, we construct dictionaries for these five values by using "*word2vec*" model[2] (Mikolov et al., 2013) and count the terms from dictionaries in annual report to score the culture values.

Given the significant differences in terms of lexical, syntactic, grammatical, and semantic features between English and Chinese as written language (Wang and Chen, 2013), we segment the text and try to keep the terms in this process as much as possible by using a pre-trained dictionary to maintain semantics. Moreover, our construction of the corporate culture measure is based on the textual analysis of firms' annual reports instead of earnings call scripts, due to the low coverage and quality of such scripts in China. To validate our corporate culture measure, we employ markers for the five cultural values and examine the association between cultural values and these markers.

Next, we measure firms' exposure to the trade war using their analysts' reports in which stock analysts analyze the potential risks of their covered firms related to the trade war. Following the existing studies (Hassan et al., 2019, 2020a, 2020b; Sautner et al., 2020), we measure the exposure by screening for the keywords reflecting a firm's exposure to the Sino-US trade tension. The lexicon of trade war is also constructed with the *word2vec* model and we keep the terms that have highest cosine similarity to the seed word "Sino-US Trade War". We manually cross-checked the relevance of these terms to the trade war. To validate the trade war exposure measure, we use the export and import data between Chinese and American firms from the Chinese customs dataset, from 2015 to 2016, and find a significant positive association between the amount of Sino-US business and the trade war exposure.

Based on a sample of 3688 Chinese listed firms, we find that their next month's abnormal returns decrease with their exposure to the trade war. Specifically, firms with higher exposure to the trade war on average underperform other firms without any trade war exposure by 1.45% in excess monthly return, or 0.89% in DGTW (Daniel et al., 1997) abnormal return. This deterioration in stock performance due to the trade war is robust after controlling for firm characteristics, factor loadings based on four-factor model of Liu et al. (2019), firm and month fixed effects. In the multivariate regressions, abnormal stock returns are regressed on corporate culture, trade war exposure, the interaction term of these two variables, and firm characteristics. The interaction term captures the impact of corporate culture on monthly stock returns for a given level of exposure to the trade war. The coefficient of the interaction term is positive and significant at a level of 1%, indicating that firms with a strong corporate culture suffered a smaller loss in returns.

We identify two channels through which culture makes firms more resilient to the trade war, namely enhancing operating performance and releasing financial constraints. In more details, firms with a strong culture tend to have higher profit margins, higher growth rate, more trading credit, and lower financial constraints, which in turn make them better performers in the Sino-US trade war. We also find that POEs with strong corporate cultures showed stronger resilience to the trade war when we compare the decline in monthly returns between firms with a strong corporate culture and firms with weak ones. Further analyses reveal that there are four most helpful individual cultures for POEs, *innovation*, *hardworking, teamwork* and *quality*.

This paper contributes to the three strands of the literature. The first related literature documents the impact of corporate culture on firm performance. Corporate culture is found to enhance firm performance (Barney, 1986; Hofstede et al., 1990; O'Reilly and Chatman, 1996; Sørensen, 2002; Zuckerman, 2002). Recently Li et al. (2021a, 2021b) employ textual analysis to measure corporate culture and show it in general matters for US firms and improve stock performance for firms during the Covid-19 pandemic. We provide evidence that a strong corporate culture can enhance the resilience of Chinese firms during the Sino-US trade war.

The second literature concerns the negative consequences of trade wars. The trade war between the US and China has attracted considerable attention from academia, policymakers, and practitioners (Bown and Kolb, 2022; Amiti et al., 2019, 2020; Besedes et al., 2020; Itakura, 2020). We find that the trade war between US and China presents a severe downward impact on Chinese firms, while strong corporate culture can significantly ease such a downward impact. Our paper provides further evidence supporting that the culture-performance relationship is more pronounced in bad times. One important corporate defense against severe adverse external shocks is the inner strength within. Sound corporate culture helps bond employees, management, and stakeholders for resilience and coherence. Our study provides further evidence that the Sino-US trade war has adversely affected the stock market in China, and that a

[2] The *word2vec* (Mikolov et al., 2013; Song et al., 2018) model used in our research can quantify word terms into a vector of numbers semantically.

strong culture can mitigate such a negative impact.

The third strand of literature applies textual analysis or machine learning techniques in financial studies. After the pioneering work of Loughran and McDonald (2011), text-based analyses were well used in studies in corporate finance. For example, Baker et al. (2016) and Caldara and Iacoviello (2022) use news information to measure regional political risk and geopolitical risk; Hassan et al. (2019) identify the firm-level political risk by screening the political terms in a specific range around the key words of risk; Bellstam et al. (2021) develop a new measurement of innovation of firms by the LDA model. Li et al. (2021b) introduce the word embedding model to measure firms' corporate culture, a model that captures the semantics rather than merely the syntactic meaning at the expression level. Our research innovatively introduces the word embedding model in measuring corporate culture and the Sino-US trade war exposure of firms in China.

The remainder of this paper proceeds as follows. Section 2 reviews the related literature and develops the hypotheses. Section 3 describes the data and the methodology used to measure corporate culture scores and firms' exposure to the trade war. Section 4 reports the main findings, explores the heterogeneity and performs robustness tests. Section 5 investigates the potential mechanisms. Section 6 provides further discussions. Section 7 concludes the paper.

2. Hypothesis development

The Sino-US trade frictions present immense challenges for cross-border trade or investment. Han et al. (2022) find that US sanction causes worse innovation and stock performance of Chinese firms in the sectors being sanctioned. Tariffs can slow down technology adoption by foreign exporting firms (Crowley, 2006). China is one of the largest export markets for US goods and services. The US firms that depend more on importing from or exporting to China experience worse stock performance (Huang et al., 2019). The United States imports more from China than from any other country. The exposure to the trade conflict between China and US presents a significant challenge for these firms that are deeply rooted in the global supply chain. Thus, our first hypothesis is as follows:

Hypothesis 1. Chinese firms exposed to the Sino-US trade war suffer worse stock performance.

Culture shapes economic activities (Weber, 1930), as it determines people's decision-making dictated by preferences and beliefs (Hofstede and Hofstede, 2001; Talhelm et al., 2014) during different economic development stages across regions (Guiso et al., 2003; Algan and Cahuc, 2010; Nunn, 2008). Cultural perspectives are also considered important determinants of corporate financial decisions (Bertrand and Schoar, 2003; Guiso et al., 2008; Chui et al., 2010; Eun et al., 2015; Pursiainen, 2022).

Kreps (1990) argues that corporate culture plays a vital role in firms' dealing with unforeseen contingencies that surface during crises or in a challenging operational environment. Schein (1990) suggests that corporate culture as intangible asset functions via shared assumptions, values, and beliefs that help employees understand which behaviors are appropriate. Similarly, several studies (Guiso et al., 2015; Graham et al., 2022; Grennan, 2019) emphasize the importance of corporate culture in strengthening the employees' sense of worth in workplaces. Lins et al. (2017) find that the firms with high corporate social responsibility intensity have higher stock returns during the 2008–2009 financial crisis. Li et al. (2021a) provide evidence that corporate culture helps mitigate adverse shocks of Covid-19 on stock performance. Li et al. (2021b) report the result that strong corporate culture can mitigate the negative impact in bad time such as the 2008 financial crisis and BP's oil spill.

All these studies suggest that strong corporate culture enhances firms' resilience during a crisis. In such environments, firms with sound corporate culture are equipped with stronger employees, better operating performance, and more trust from investors, enabling them to face and navigate great uncertainties (Lins et al., 2017; Li et al., 2021a, 2021b). Hence, we contemplate that strong corporate culture should play an important role in strengthening Chinese firms' resilience to the Sino-US trade war.

Hypothesis 2a. Strong corporate culture helps Chinese listed firms to be more resilient during the Sino-US trade war.

The literature on international trade conflicts focuses on the economic impacts of hostilities between countries or regions. Trade conflicts often result in severe economic and financial consequences. For example, Guiso et al. (2009) find that lower bilateral trust leads to less trade between two countries, less portfolio investment, and less direct investment. Glick and Taylor (2010) identify the effects of military hostility with severe disruptions in international business. Fisman et al. (2014) provide direct evidence that the deterioration of Sino-Japanese relations harms the inter-trading between these two countries and the stock performance of Japanese firms that are highly exposed to the Chinese market. Itakura (2020) estimates that the escalating of the Sino-US trade war reduces gross domestic product (GDP) by 1.41% and 1.35% for China and US respectively. Huang et al. (2019) show that the stock return and default risk of US firms were adversely influenced by the Sino-US trade war. Moreover, firms with negative risk exposure but have strong corporate cultures were generally more resilient in crises (Li et al., 2021a, 2021b). So, we hypothesize that the firms exposed to the trade war but with strong corporate culture suffered a smaller decrease in abnormal returns compared to the firms with weaker corporate culture.

Hypothesis 2b. Exposed firms in China with a strong corporate culture experienced a smaller drop in their stock returns compared with exposed firms with a weak one.

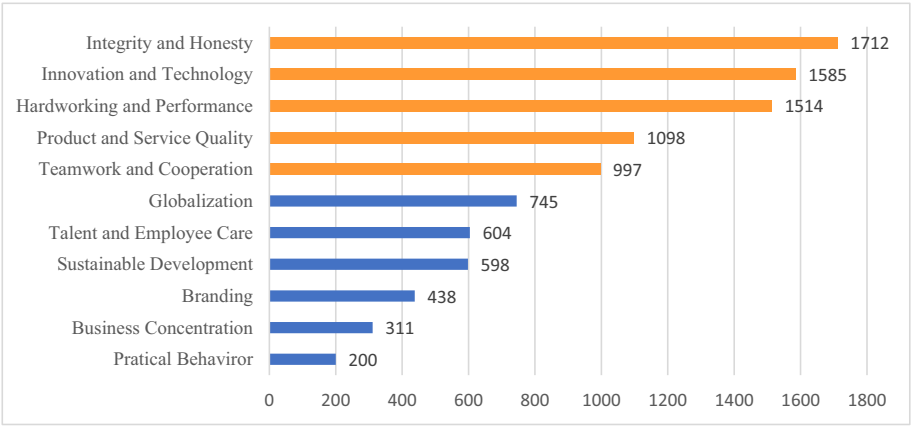

Fig. 1. An overview of corporate culture topics of Chinese firms listed as A-Share in the stock market.

3. Data and variable construction

3.1. The sources of data

We collect the annual report from the Shenzhen and Shanghai Stock Exchange websites and the analyst reports of listed firms from the WIND database. We obtain the firm characteristics, financial information, and stock trading data from the China Stock Market Accounting Research Database (CSMAR). To identify the most-mentioned cultures in China, we manually collect the corporate culture statement from the corporate websites of the Chinese A-Share market stocks. The primary data set used in the analysis contains corporate culture measure, trade war exposure measure, firm characteristics, and stock performance. The process of generating the corporate culture measure and the trade war exposure measure is described in the section 3.2. The explanation of the main variables is presented in Appendix A.

3.2. Measuring corporate culture

3.2.1. Seed words

Following Li et al. (2021b) and Guiso et al. (2015), we measure corporate culture by the five cultural values.[3] A corporate website usually has a section dedicated to the core values of the company. Chinese companies state their core values in mission and goal statements with an emphasis placed on certain keywords. To identify the seed words, we hand-collected the descriptions of the corporate values from these mission statements from the websites of 2818 Chinese listed firms; next we segment the text into terms and group these terms into different categories based on their meaning; we manually check the relevance of these terms and only keep the terms incorporating the five cultural values. Then, each of these terms is assigned a 200-dimensional vector from the Tencent *word2vec* model, where the vector quantitatively proxies the semantic meaning of the term. We subsequently cluster these terms into 200 groups by using the vector data and K-means algorithm. After the aggregation process, eleven corporate culture topics were identified.

Fig. 1 presents the extracted corporate culture topics and reports the number of firms that have mentioned each of the topics. "Integrity and Honesty" is the most popular topic that has been mentioned by 1712 firms (about 60% of our sample), then followed by "Innovation and Technology" (56%). About 1514 firms (53%) used the terms "Hardworking and Performance", and 1098 firms mention the terms "Product and Service Quality" in their mission statements, while 997 (35%) of firms mention the terms "Teamwork and Cooperation". Our reported distribution of corporate values is similar to those reported in Guiso et al. (2015)[4] for S&P 500 firms. We identified "Integrity and Honesty" (*Integrity*), "Innovation and Technology" (*Innovation*), "Hardworking and Performance" (*Hardworking*), "Product and Service Quality" (*Quality*), and "Teamwork and Cooperation" (*Teamwork*) as the five most important cultural values for Chinese firms.[5]

3.2.2. Generating the culture dictionary

Following Li et al. (2021b), we used a trained *word2vec* model to develop a "culture dictionary" by computing the cosine similarity between the vector of seed words and the terms in annual report and identifying the terms that are most similar to the keywords. First, we obtain an averaged vector that represents the semantic meaning of each cultural value. To do so, we average the vectors of terms

[3] The five cultural values in Li et al. (2021b) are innovation, integrity, quality, respect, and teamwork.
[4] S&P 500 firms are innovation (80%), integrity (70%), Quality (60%), respect (70%), and teamwork (50%).
[5] There were identified as the most important cultural values Li et al. (2021b) for 2894 US firms over the period Jan. 22, 2020-Apr. 30, 2020.

under each cultural value topic identified in section 3.2. For example, suppose that we categorize n terms to the corporate value "Product and Service Quality" in the last section. Let the first term in the group "Product and Service Quality", to be the vector $V^{\{1\}} = \left[x_1{}^{\{1\}}, x_2{}^{\{1\}}, \ldots, x_{200}{}^{\{1\}}\right]$, and the last term to be $V^{\{n\}} = \left[x_1{}^{\{n\}}, x_2{}^{\{n\}}, \ldots, x_{200}{}^{\{n\}}\right]$. Then we average the vectors of these terms, $\overline{V}^{\{Product\ and\ Service\ Quality\}} = \frac{1}{n}\sum_{i=1}^{n}\left[x_1{}^{\{i\}}, x_2{}^{\{i\}}, \ldots, x_{200}{}^{\{i\}}\right]$.

Next, we identify the terms that are most semantically similar to the keywords. To do so, we calculate the cosine similarity between the vector of each unique term in the annual report and the averaged vector of seed words for each cultural value, for example $\overline{V}^{\{Product\ and\ Service\ Quality\}}$. Then we keep 3000 unique terms with the highest similarity score. Finally, we manually inspect the terms in the auto-generated dictionary and keep the terms that truly fit the corporate value.

Instead of training the *word2vec* model with a limited number of annual reports, we use a *word2vec* model developed by the Tencent Artificial Intelligence Lab[6] (Tencent AI Lab model) (Song et al., 2018). The model has a high level of coverage of Chinese terms, and it is trained on the text of articles of wide scale from various sources of information. The vectors in this model can express the meanings of the terms more accurately and efficiently than a self-trained model, so as to better measuring the semantic similarities between the seed words and the unique terms in annual reports.

Another use of this *word2vec* model is in text segmentation. Unlike English, the Chinese language does not naturally have space between words, and the effort to segment a text can be more challenging. For example, the Chinese term with the meaning of "Fintech" will be separated to the two terms meaning "Finance" and "Technology". To avoid information loss in the segmentation of text, we train a pre-defined lexicon, a list of 12.2 million terms extracted from Tencent AI Lab model. With this enhancement, the terms in the lexicon will be kept in the text segmentation process. For example, the text with the meaning of "Fintech" will now be transformed to not only the terms meaning "Finance" and "Technology" but also the term meaning "Fintech".

3.2.3. Scoring the corporate culture

Next, we score each of the cultural values at the firm-fiscal year level. We screen and count the culture dictionary terms in the *Discussion and Analysis of the Operation* section in annual report.[7] Our defense of the use of the annual report is as follows. The existing studies use the earning conference call for the textual analysis (e.g., Li et al., 2021a, 2021b; Hassan et al., 2020a, 2020b; Sautner et al., 2020). However, for the online earning conference in China, questions and responses are of low quality due to the absence of restrictions on the qualification of participants. For another alternative text data source, the conference record of analyst investigation, only 2470 (53%) Chinese A-share market listed firms have disclosed this record from 2012 to 2020. For example, ZTE Corporation, one of the most famous communications equipment companies in China, did not disclose any analyst conference report until November 2020, following the temporary sanctions issued by the US government in 2018. Therefore, rather than using conference calls or analyst investigation records, we use the annual report to score corporate culture of firm. Moreover, annual reports contain higher information quality and better firm coverage since the disclosure is under the supervision of the regulator and is required to be released annually, a feature that makes annual report more suitable for our research.

To measure the corporate cultures score, we use the weighted counts of the number of terms associated with each corporate culture value divided by the total number of terms in the document. The weight is determined using the Term Frequency-Inverse Document Frequency (TF-IDF) algorithm. The model is shown as follows:

$$W_{x,y} = tf_{x,y} \times log\left(\frac{N}{df_x}\right)$$

where the $W_{x,y}$ is the weight of word x in the document y, $tf_{x,y}$ is the frequency of x in y, df_x is the number of documents containing x, and the N is the total number of documents. For each document, the TF-IDF algorithm gives greater weight to the terms that appear more frequently in a specific document and less frequently in others. This method balances the significance of a word in a document and its importance within the corpus. Fig. 2 presents the word-cloud graph for each topic of value.[8]

We validate our cultural measure by regression between the corporate culture scores with the markers. To validate the culture value of "Integrity and Honesty" we use a degree of real earnings management (*EarningsManagement*) and the number of times the firm has violated regulation and has been punished by the regulators (*Fault*). To validate the cultural value of "Innovation and Technology", we use both the ratio of research and development expense to the total asset (*R&D*) and the number of patents (*Patents*). To validate the cultural value of "Hardworking and performance", we use annual change in earnings (*EarningGrowth*). To validate the cultural value of "Product and Service Quality", we use the number of contract-related lawsuits that the firm involved as a defendant (*LawSuit*) and the certification of ISO9001 (*ISO9001*). To validate the cultural value of "Product and Service Quality", we use the number of joint

[6] The Tencent *word2vec* model covers a large-scale of news, webpage text, and novels in model training so it has much better topic and word coverage and probably higher accuracy in finding associations between the words than the model trained by limited text data. The model contains 12,287,936 unique words or phrases in Chinese and English, each of which has a 200 dimensions vector. The downloading link and the other information about this model are available on: https://ai.tencent.com/ailab/nlp/en/embedding.html

[7] In this section, managers discuss essential issues in operation, such as business strategy, product development, new technology research, social responsibility, employee care, etc.

[8] We use the *wordcloud* package in python to generate these word-cloud graphs automatically. The algorithm chooses the word automatically according to the frequency of these terms. The higher frequency of appearance of the term in the text data, the larger size the term is shown in the graph.

Integrity and Honesty

Innovation and Technology

Hardworking and Performance

Product and Service Quality

Teamwork and Cooperation

Fig. 2. Word Clouds for Different Topics.

ventures in which the firm has participated (*JointVenture*). The validation results are presented in Appendix B.

3.3. Estimating firm-level exposure to trade war

3.3.1. Method and text data source

In this section, we describe how we estimate the firms' exposure to the trade war. The measurement of the firms' exposure to a particular event is a key issue in the financial study, especially in the study of the impact of the event on the performance of the financial market. Fisman et al. (2014) investigate the Sino-Japanese conflict and its impact on the stock market. The exposure of a Japanese firm in this event is calculated as a ratio between the sales of a Japanese firm in China and the total sales. Huang et al. (2019) measure the Sino-US exposure by using the tariffs expense of firms collected from a unpublic supply chain database.

We measure the exposure of firms to the Sino-US trade war by constructing a Sino-US trade war dictionary. Then, following the recent studies (Hassan et al., 2019, 2020a, 2020b; Sautner et al., 2020; Caldara et al., 2020; Benguria et al., 2022) that use lexicon method, wecount the number of terms from the trade war dictionary and determining the proportion of these Sino-US trade war terms in the analyst report. The reasons we use the analyst report in determining firms' exposure to trade war are as follows: Analyst reports usually provide profound studies for the firms, including the issue of the extent to which the firm's business is exposed to trade war. Because analysts are professional, they have more detailed research on companies, and their opinion on the impact of the Sino-US trade war can be more reliable than other sources such as the news or stock online forums (Huang et al., 2018).

3.3.2. Generating trade war dictionary and measuring trade war exposure

To measure firm exposure to the trade war, we first generate a Sino-US dictionary by identifying the most relevant terms that are most associated with the Sino-US trade war. Again, we use the Tencent AI Lab *word2vec* model to identify and retain the first 1000 terms with their *word2vec* vector that have the greatest cosine similarity to the word vector for "Sino-US trade war" (Appendix C shows the dictionary). Each of the sentence in 295,024 analyst reports is screened, and the sentences containing the words/phrases in the dictionary are counted. Moreover, in order to avoid a mistaken inclusion of the Sino-Europe business conflict statement, we leave out the sentences that suggest no trade war exposure, such as a sentence with the terms meaning "no influence" or "the risk has been moderated", and the sentences with terms related to Europe are also eliminated. Finally, we keep 8044 sentences, corresponding to 3275 firm-month observations. We measure the Sino-US exposures in two ways: by identify the existence of trade war related sentence and by calculating the proportion of trade war related sentences, for each firm in each month.

3.3.3. Validating the trade war exposure

We examine the validation of our newly constructed trade war exposure by identifying whether the trade war exposure measured from 2017 is associated with the actual trade war exposure from 2015 to 2016 through a cross-sectional regression. To measure the real Sino-US exposure, we use a unique customs dataset of listed firms from 2015 to 2016,[9] which contains the quantity of goods or services exported to and imported from the US. Appendix D presents the results of our validation tests. The dependent variable is a dummy variable that is equal to one if the word/phrase in the Sino-US trade war dictionary is mentioned in the analyst report, from 2017 to 2020, otherwise zero. The independent variable is the quantity of goods or services exported to the US or the amount of imports. We show that the measures of trade with the US are positively and significantly associated with the trade war exposure, after controlling for firm characteristics and industrial fixed effects. This result indicates that, the more businesses with the US the greater probability the firm will be exposed to the Sino-US trade war in the future.

3.4. Sample window of the analysis

In our baseline study, we chose 2018 as the sample window, for the following reasons. First of all, 2018 marks the first year that Chinese companies face a serious challenge from the Sino-US trade war. In 2018, more than fifty trade war related events took place, including a sanction to the ZTE Corporation, a Chinese high-tech listed telecom firm, in Apr 2018.[10] According to Weber's Law,[11] after a strong stimulus, people tend to underreact to the following new stimulus. So, it is likely that, after the striking start of the Sino-US trade war in 2018, shareholders and investors may underreact to the new tariffs or sanctions in the following years. In addition, the company exposed to the trade war may have better preparation in the following years, e.g., by transferring the market from the US to other countries.

Second, Chinese stock market experienced a typical bear market in 2018: "*it's been the worst in a decade*".[12] The unsuccess of the market in 2018 can be partially contributed to the Sino-US trade war and the policy reaction of the Chinese government, as in this news: "*Beijing's ongoing trade war with Washington dominated headlines for much of the year, with the Chinese markets taking hits throughout as authorities undertook a string of measures, such as cutting the amount of reserves held by banks, with limited success in calming traders*". Li

[9] The data is provided by the UNNC-NFTZ Blockchain Laboratory: http://nottingchain.com/cn/index.html. According to this institution, the data is processed from the exporting and importing data of Chinese Custom. The data is only available from 2015 to 2016.

[10] https://www.forbes.com/sites/ywang/2018/06/18/chinas-zte-faces-long-lasting-damage-from-u-s-trade-sanctions/?sh=279486e430ac

[11] Weber's Law explain the psychological effect that the stronger the stimulus people receive at the beginning, the slower they will respond to the stimulus in the future. The introduction page is available at: https://en.wikipedia.org/wiki/Weber%E2%80%93Fechner_law

[12] https://www.cnbc.com/2018/12/31/china-markets-2018-performance-was-worst-in-a-decade.html

Table 1
Summary statistics for the variables in main regressions.

VARIABLES	N	mean	sd	min	max
ExcessReturn	42,255	−0.0032	0.1110	−0.7675	4.0407
DGTWReturn	40,067	0.0000	0.0913	−0.6754	1.2445
TradeWar	42,364	0.0206	0.1419	0.0000	1.0000
TradeWar_Count	42,364	0.0004	0.0037	0.0000	0.1671
CultureScore	35,385	5.6748	2.8537	1.0000	10.0000
Integrity	35,385	5.8010	2.4802	3.0000	10.0000
Innovation	35,385	5.5208	2.8711	1.0000	10.0000
Hardworking	35,385	5.5016	2.8688	1.0000	10.0000
Quality	35,385	5.5229	2.8692	1.0000	10.0000
Teamwork	35,385	5.5070	2.8780	1.0000	10.0000
ROE	41,069	0.0154	1.7032	−176.3802	1.5932
Size	42,224	22.3110	1.51218	17.6958	30.9703
Leverage	42,224	0.4208	0.2189	0.0093	2.9220
Tobin's Q	39,970	1.9094	1.7264	0.6927	44.0052
SalesGrowth	40,831	3.4033	367.6049	−11.9245	42,879
FixedGrowth	41,219	0.1334	1.3934	−1.0000	65.7210
CEOChair	40,314	0.6915	0.4619	0.0000	1.0000
BoardIndependence	40,866	0.3762	0.0547	0.1000	0.8000
BoardSize	40,878	8.5111	1.7849	0.0000	18.0000
BoardOwnership	39,431	0.4180	0.7867	0.0000	8.0462

In this table, we provide the summary statistics. We report the mean, median, standard deviation, minimum number, and maximum number.

Table 2
The Sino-US trade war exposure and stock returns.

VARIABLES	ExcessReturn			DGTWReturn		
	(1)	(2)	(3)	(4)	(5)	(6)
TradeWar	−0.0145***	−0.0132***	−0.0117***	−0.0089***	−0.0105***	−0.0110***
	(0.0038)	(0.0041)	(0.0042)	(0.0034)	(0.0039)	(0.0039)
ROE		0.1017***	−0.0196		−0.0293**	−0.0078
		(0.0147)	(0.0165)		(0.0126)	(0.0146)
Size		−0.0628***	−0.0458***		−0.0173**	−0.0178**
		(0.0106)	(0.0097)		(0.0074)	(0.0074)
Leverage		0.0838***	0.0387*		0.0170	0.0249
		(0.0209)	(0.0204)		(0.0183)	(0.0184)
Tobin's Q		−0.0179***	−0.0288***		−0.0145***	−0.0165***
		(0.0020)	(0.0025)		(0.0018)	(0.0022)
SalesGrowth		0.0083***	0.0054***		0.0038***	0.0044***
		(0.0011)	(0.0011)		(0.0010)	(0.0010)
FixedGrowth		0.0152***	0.0052*		0.0063**	0.0069***
		(0.0030)	(0.0028)		(0.0025)	(0.0025)
Factor Loadings	NO	YES	YES	NO	YES	YES
Month FE	NO	NO	YES	NO	NO	YES
Firm FE	YES	YES	YES	YES	YES	YES
Observations	42,255	27,269	27,269	40,067	26,955	26,955
Pseudo/Adj. R^2	0.0004	0.0258	0.1329	0.0002	0.0199	0.0225

This table presents the panel data regressions estimates of the relation between the trade war exposure and abnormal stock return over 2018. The dependent variables are two measures of abnormal return, the excess return and DGTW abnormal return. The key independent variable is the trade war exposure proxied by the textual analysis from analyst reports. The control variable consists of firm feature variables and the factor loadings in the last available period. The fixed effects (FE) used in each specification are at the firm-month level and are noted in the table. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses. R^2 values are given in the table. $^*p < .1$; $^{**}p < .05$; $^{***}p < .01$.

et al. (2021a, 2021b), and Lins et al. (2017) indicate that a strong corporate culture and higher corporate social responsibility intensity help the stock performance of companies to be resilient in the negative shock and bear market. Therefore, Year 2018 is probably the best time window to observe the impact of the Sino-US trade war on stock performance.

4. Main results

This section presents our main results. Our empirical strategy is following Li et al. (2021a). We first examine the impact of trade war exposure on firms' performance. Next, we investigate whether strong corporate culture alleviate the negative impact of trade war exposure on firms' stock returns. We document a sharp divergence in the impact of trade war exposure on firms with strong corporate cultures from those without strong culture, with the firms with strong corporate cultures suffering a smaller drop in their stock returns.

Table 3
Corporate culture and abnormal stock returns.

Panel A: Corporate culture and abnormal returns during the crisis

VARIABLES	ExcessReturn			DGTWReturn		
	(1)	(2)	(3)	(4)	(5)	(6)
CultureScore	0.0040***	0.0030**	0.0026**	0.0034**	0.0040**	0.0035**
	(0.0013)	(0.0013)	(0.0013)	(0.0017)	(0.0017)	(0.0017)
ROE		0.0018***	0.0021***		0.0033***	0.0031***
		(0.0004)	(0.0004)		(0.0006)	(0.0005)
Size		0.0174***	0.0173***		−0.0113**	−0.0132**
		(0.0033)	(0.0036)		(0.0048)	(0.0053)
Leverage		−0.1070***	−0.1152***		−0.0551	−0.0772**
		(0.0233)	(0.0248)		(0.0343)	(0.0355)
BoardIndependence			0.0602			0.0687
			(0.0799)			(0.1075)
CEOChair			0.0111			0.0280**
			(0.0088)			(0.0114)
BoardSize			0.0035			0.0046
			(0.0025)			(0.0033)
BoardOwnership			0.0213**			−0.0087
			(0.0098)			(0.0124)
FactorLoadings	NO	YES	YES	NO	YES	YES
Industry FE	NO	YES	YES	NO	YES	YES
Observations	3040	2904	2747	2980	2856	2718
Pseudo/Adj. R^2	0.0032	0.1138	0.1158	0.0014	0.0934	0.0968

Panel B: Corporate culture and abnormal returns surrounding the crisis

VARIABLES	PreCrisis: 2016			PreCrisis: 2016–2017	
	ExcessReturn	DGTWReturn		ExcessReturn	DGTWReturn
	(1)		(2)	(4)	(5)
Culture×Crisis	0.0041***		0.0057***	0.0043***	0.0057***
	(0.0014)		(0.0017)	(0.0013)	(0.0017)
Culture×PreCrisis	−0.0041**	−0.0018		0.0017	0.0002
	(0.0019)	(0.0018)		(0.0014)	(0.0012)
FirmCharacteristics	YES	YES		YES	YES
FactorLoadings	YES	YES		YES	YES
Year FE	YES	YES		YES	YES
Industry FE	YES	YES		YES	YES
Culture×(Crisis- PreCrisis)	0.0082	0.0075		0.0026	0.0055
p-Value	(0.0024)	(0.0055)		(0.1767)	(0.0191)
Observations	2980		2856	3040	2904
Pseudo/Adj. R^2	0.0854		0.0318	0.0850	0.0317

Panel A in this table presents baseline cross-sectional estimates of the relation between culture score and abnormal stock returns in 2018. The key independent variable is the ten decile levels of the corporate culture score. Panel B presents comparison between baseline panel estimates in the period from 2016 to 2017 and the estimate in 2018. The key independent variables are interaction terms consisting of corporate culture score and the dummy variables indicating the periods in 2016, from 2016 to 2017, or 2018. The dependent variables are two measures of abnormal return, the excess return and DGTW abnormal return. The control variables are the firm characteristics and the factor loadings. The fixed effects (FE) used in each specification are at the industrial level. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses. R^2 values are given in the table. *p < .1; **p < .05; ***p < .01.

Before exhibit the empirical results, we provide summary statistics in Table 1.

4.1. The Sino-US trade war exposure and abnormal stock returns

First, we estimate the regression from eq. (1) with fixed effects to identify the influence of the Sino-US trade war exposure on firms' abnormal stock returns:

$$\begin{aligned} Abnormal\ Ret_{i,m+1} = {} & \alpha + \beta_1 TradeWar_{i,m} + \beta_4 FirmCharacteristics_{i,q-1} + \beta_5 FactorLoadings_{i,m} \\ & + FirmFixedEffect + MonthFixedEffect + \varepsilon_{i,t} \end{aligned} \tag{1}$$

where $Abnormal\ Ret_{i,\,m+1}$ is the monthly abnormal return, $TradeWar_{i,\,m}$ is the monthly trade war exposure, $FirmCharacteristics_{i,\,q-1}$ is the quarterly firm characteristics known to affect stock returns frequency, and the $FactorLoadings_{i,\,m-1}$ is the monthly factor loading

estimated for stock *i*.[13] For robustness checking, we define abnormal return as excess return (*ExcessReturn*) or as DGTW abnormal return (*DGTWReturn*). In our model, we control for firm-month fixed effects.

Table 2 presents the results. The coefficients of trade war exposure are all negative and significant. Our findings strongly suggest that the exposure to the trade war reduced the affected firm monthly returns, on average, by about 1%. For example, column (3) reports the firms exposed to the trade war on average suffered a drop in monthly returns of 1.17%, when compared to the market. The result in column (6) indicates that the exposed firms suffered a 1.10% loss of DGTW abnormal return.

4.2. Corporate culture, Sino-US trade war exposure, and abnormal stock performance

In this section, following Li et al. (2021a), we examine whether strong corporate culture reduce firms' monthly return drop by the following model:

$$Abnormal\ Ret_{i,2018} = \alpha + \beta_1 CultureScore_i + \beta_2 FirmCharacteristics_{i,2016to2017} + \beta_3 FactorLoadings_i + IndustryFixedEffect + \varepsilon_{i,t} \quad (2)$$

In model (2) the $Abnormal\ Ret_{i,\ 2018}$ is the yearly abnormal return in 2018, which is also defined in terms of excess return (*ExcessReturn*), and the DGTW abnormal return (*DGTWReturn*). The indicator variable $CultureScore_i$ takes value from 1 to 10 according to the sum of the firm's five cultural value scores from 2016 to 2017.[14] We control for firm characteristics known to affect stock returns and a firm's factor loadings estimated over the previous 60 months prior to 2018. Following Li et al. (2021a, 2021b), we include industry-fixed effects for this model. Panel A in Table 3 shows that firms with a strong culture have a significantly better stock performance during 2018, and the findings are robust across different model specifications. For example, column (1) in Panel A indicates that a unit increase in $CultureScore_i$ is associated with 0.4-percentage-point increase in the yearly excess return during 2018 on average.

Moreover, if the corporate culture is correlated with governance, it is possible that corporate culture is simply proxying for corporate governance, resulting in an omitted variable bias. To address this concern, following Lins et al. (2017), we include four corporate governance control variables (*BoardIndependence*, *CEOChair*, *BoardSize* and *BoardOwnership*) in the model to ensure that our findings persist after we control for the corporate governance proxies. Columns (3) and (6) in Panel A show that the effect of corporate culture on abnormal returns persists after control the corporate governance variables.

We also investigate whether the positive relation between strong corporate culture and stock performance is unique to our research time window, 2018, or is common to most periods before the trade war, a scenario under which the relation can be attributed to omitted risk factors related to corporate culture. To address this concern, following Lins et al. (2017), we implement a difference-in-difference model. Specifically, we construct regression model (3), with a year frequency panel data from 2016, two years prior to the onset of the crisis, to the end of 2018. $Crisis_t$ is a dummy variable set to one in 2018 otherwise zero, while $PreCrisis_t$ is a dummy variable set to one in 2016 otherwise zero. For robustness check, we also set $PreCrisis_t$ to one in period from 2016 to 2017. The firm's *CultureScore*, *Crisis* and *PreCrisis* terms are omitted due to multicollinearity.

$$\begin{aligned} Abnormal\ Ret_{i,t+1} =& \alpha + \beta_1 CultureScore_{i,t} \times Crisis_t + \beta_2 CultureScore_{i,t} \times PreCrisis_t + \beta_2 FirmCharacteristics_{i,t} \\ &+ \beta_3 FactorLoadings_{i,t} + IndustryFixedEffect + YearFixedEffect + \varepsilon_{i,t} \end{aligned} \quad (3)$$

The results are presented in Panel B in Table 3. Columns (1) and (2) show the results in the model that $PreCrisis_t$ is set to one in 2016 otherwise zero, and columns (3) and (4) show the results in the model that $PreCrisis_t$ is set to one in period from 2016 to 2017. The coefficients of the crisis interaction term are positive and significant, indicating that strong corporate culture firms exhibit superior performance during 2018; before 2018, the relation between corporate culture and abnormal returns becomes insignificant. These results indicate that the excess abnormal return earned by stronger corporate culture is limited to 2018, consistent with our suggestion that Chinese listed companies with a stronger corporate culture have been more capable of withstanding the impact of Sino-US trade war.

We next investigate whether the positive corporate culture-abnormal return relationship is unique to the firm exposed to trade war by following Li et al. (2021a). Meanwhile, we investigate how much a strong corporate culture can mitigate the negative impact of trade war on firms' abnormal returns during the crisis. The interaction term $TradeWar_{i,\ m-1} \times CultureScore_i$ in Model (4) captures the differential impact of corporate culture on monthly abnormal returns in 2018, for a given level of overall exposure to the Sino-US trade war.

$$\begin{aligned} Abnormal\ Ret_{i,m} =& \alpha + \beta_1 TradeWar_{i,m-1} + \beta_2 TradeWar_{i,m-1} \times CultureScore_i + \beta_3 CultureScore_i + \beta_4 FirmCharacteristics_{i,y-1} \\ &+ \beta_5 FactorLoadings_{i,m-1} + FirmFixedEffect + MonthFixedEffect + \varepsilon_{i,t} \end{aligned}$$

Table 4 presents the results. Similar to the results in Table 2, coefficients of $TradeWar_{i,\ m-1}$ remaining negative and significant. Moreover, the positive and significant coefficients on the interaction term indicate that firms with a strong culture are associated with a

[13] The factor loading is based on the 4-factors model developed by Liu et al. (2019). The four factors are are the market factor, value minus growth (VMG), small minus big (SMB), and the pessimistic minus optimistic (PMO). Factor loadings are re-estimated each month based on the previous 60 months data. The factor data is available in the website: https://finance.wharton.upenn.edu/~stambaug/.

[14] We use the corporate culture score in 2016 to 2017, the most recent two years before 2018, to eliminate the concern that firms changed their culture due to serious consequence of trade war.

Table 4
Test with interaction term: the effect of the corporate culture.

VARIABLES	ExcessReturn	DGTWReturn	ExcessReturn	DGTWReturn
	(1)	(2)	(3)	(4)
TradeWar	−0.0325***	−0.0334***	−0.0204***	−0.0212***
	(0.0093)	(0.0084)	(0.0077)	(0.0072)
TradeWar × CultureScore	0.0031**	0.0034***	0.0024**	0.0023**
	(0.0014)	(0.0012)	(0.0011)	(0.0010)
CultureScore			0.0005***	0.0004***
			(0.0002)	(0.0001)
FirmCharacteristics	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Firm FE	YES	YES		
Industry FE			YES	YES
Observations	26,217	25,907	26,217	25,907
Pseudo/Adj. R^2	0.1389	0.0232	0.1227	0.0146

This table presents the panel data regression estimates of the relation between the abnormal stock return and interaction term consisting of trade war exposure and culture score over 2018. The dependent variables are two measures of abnormal return, the excess return and DGTW abnormal return. The key independent variable is the intersect term multiplied by the exposure to the trade war and the culture score level. The control variable consists of firm feature variables and the factor loadings in the last available period. The fixed effects (FE) used in each specification are at firm and month levels for columns (1) and (2) or are at industry and month levels for columns (3) and (4). Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses. R^2 values are given in the table. *$p < .1$; **$p < .05$; ***$p < .01$.

Table 5
Tests in groups: The effect of the corporate culture.

Panel A. Strong culture in the top 20% and weak culture in the bottom 20%

VARIABLES	ExcessReturn		DGTWReturn	
	Strong	Weak	Strong	Weak
	(1)	(2)	(3)	(4)
TradeWar	0.0009	−0.0317***	0.0022	−0.0295***
	(0.0079)	(0.0098)	(0.0072)	(0.0085)
FirmCharacteristics	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Observations	6417	5142	6374	5068
Pseudo/Adj. R^2	0.1385	0.1396	0.0349	0.0234
Difference in coeff.	0.0317***		0.0326***	
Statistic (p-value)	6.63 (0.0100)		7.79 (0.0052)	

Panel B. Strong culture in the top 30% and weak culture in the bottom 30%

VARIABLES	ExcessReturn		DGTWReturn	
	Strong	Weak	Strong	Weak
	(1)	(2)	(3)	(4)
TradeWar	−0.0007	−0.0250***	0.0023	−0.0234***
	(0.0068)	(0.0074)	(0.0063)	(0.0067)
FirmCharacteristics	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Observations	8781	8143	8715	8040
Pseudo/Adj. R^2	0.1332	0.1410	0.0278	0.0233
Difference in coeff.	−0.0243**		−0.0257**	
Statistic (p-value)	5.32 (0.0211)		5.82 (0.0158)	

This table presents panel data regressions that estimate the relation between trade war exposure and abnormal returns under different groups of strong or weak aggregated corporate culture observations. Panel A presents the results with the definition of strong or weak culture to be top or bottom 20% culture score. Panel B presents the results with the definition of strong or weak culture to be top or bottom 30% culture score. The key independent variable is the trade war exposure proxied by the textual analysis from analyst reports. The control variables are the firm feature variables and the factor loadings. The fixed effects (FE) used in each specification are at firm and month level and are noted in the table. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. R^2 values are given in the table. The table also reports the results of the χ^2 tests on the difference in the coefficients between the groups of strong or weak culture scores for firms. *p < .1; **p < .05; ***p < .01.

Table 6
Different definition of text-based trade war exposure.

Panel A: the Sino-US trade war exposure and stock returns – defining trade war exposure variable as the ratio of related sentences

VARIABLES	ExcessReturn		DGTWReturn			
	(1)	(2)	(3)	(4)	(5)	(6)
TradeWar_Count	−0.2739*	−0.3091*	−0.3625**	−0.1873	−0.3095*	−0.3550**
	(0.1571)	(0.1780)	(0.1798)	(0.1328)	(0.1612)	(0.1631)
FirmCharacteristics	NO	YES	YES	NO	YES	YES
FactorLoadings	NO	YES	YES	NO	YES	YES
Month FE	NO	NO	YES	NO	NO	YES
Firm FE	YES	YES	YES	YES	YES	YES
Observations	42,255	23,193	23,193	40,067	22,942	22,942
Pseudo/Adj. R^2	0.0001	0.0260	0.1180	0.0000	0.0188	0.0213

Panel B: Test with an interaction term for the effect of the corporate culture-defining trade war exposure variable as the ratio of related sentences

VARIABLES	ExcessReturn		DGTWReturn	
	(1)	(2)	(3)	(4)
TradeWar_Count	−0.9561**	−1.1832***	−0.9320**	−1.2103***
	(0.4164)	(0.4408)	(0.3726)	(0.4015)
TradeWar_Count × CultureScore	0.0988*	0.1231**	0.1043**	0.1334***
	(0.0543)	(0.0578)	(0.0478)	(0.0516)
FirmCharacteristics	NO	YES	NO	YES
FactorLoadings	NO	YES	NO	YES
Month FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Observations	35,385	26,217	34,866	25,907
Pseudo/Adj. R^2	0.1091	0.1335	0.0007	0.0191

In this table, we present the panel data regression estimates of the relation between the trade war exposure and abnormal stock return over 2018. The dependent variables are two measures of abnormal return, the excess return and DGTW abnormal return. The control variable consists of firm feature variables and factor loadings. The fixed effects (FE) used in each specification are at firm and month level and are noted in the table. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. R^2 values are given in the table. *p < .1; **p < .05; ***p < .01.

smaller drop in abnormal returns. Columns (3) and (4) in Table 4 present the results with industrial fixed effect controls versus firm fixed effect, and these results are similar to those models controlled for firm fixed effect, in columns (1) and (2). These results suggest that, during the Sino-US trade war, exposed firms with a strong culture experienced a significantly smaller drop in abnormal returns than their exposed peers without a strong culture.

4.3. Robustness checks

We conduct several robustness checks on our main findings. First, we perform robustness checks on our main regression results by dividing firms into two groups based on their culture scores. Specifically, we select the firms that have the top 20% (30%) as the strong culture group, and the bottom 20% (30%) as the weak culture group.

Panel A in Table 5 shows that the coefficients for the strong culture group (firms in the top 20% of culture scores) are positive and insignificant, while the coefficients for the weak culture group are all negative and significant (firms in the bottom 20% of culture scores). Similar results hold in panel B for different specifications of strong and weak culture groups. Our findings show that the firms with weak cultures suffered more abnormal return losses in stock return in 2018, while the firms with strong cultures suffered almost no losses. All these confirm our early findings that strong culture can mitigate the adverse impact of the trade war on stock returns.

Second, we perform the robustness check by converting the measure of exposure to the trade war from a dummy variable to a continuous variable, which is defined as the ratio of the number of sentences with terms in the trade war dictionary to the total number of sentences in analyst reports of each company for each month. Table 6 reports the results. The findings in Panel A and B are not qualitatively different from those in Tables 2 and 4 respectively, suggesting that our empirical findings are consistently robust across alternative definitions of key explanatory variables.

We also conduct a robustness test by replacing the trade war exposure variable from the text-based measurement with a dummy variable that is set to one if the industries in China are more likely being exposed to the trade war in 2018. To identify the exposed Chinese industries in 2018, we look into the industries in which the firms had goods exported to the US and targeted by the tariffs announced by the US government in 2018. Specifically, the US government's tariffs mainly target electrical equipment, industrial equipment, machinery goods, airplanes, and motor vehicles equipment, etc.[15] Benguria et al. (2022) identify the Chinese industries that are most subjected to the uncertainty of trade policy in 2018 and find similar industries.

[15] The Chinese industries targeted by US tariff in 2018 are analyzed and exhibited by CNBC: https://www.cnbc.com/2018/07/05/global-trade-war-ramps-up-as-us-tariffs-on-china-kick-in.html

Table 7
Alternative definition of trade war exposure: Industry based.

VARIABLES	ExcessReturn		DGTWReturn	
	(1)	(2)	(3)	(4)
TradeWarInd × CultureScore	0.0005***	0.0005**	0.0004***	0.0004**
	(0.0001)	(0.0002)	(0.0001)	(0.0002)
CultureScore	0.0005***	0.0001	0.0002	0.0002
	(0.0002)	(0.0002)	(0.0001)	(0.0002)
FirmCharacteristics	NO	YES	NO	YES
FactorLoadings	NO	YES	NO	YES
Month FE	NO	YES	NO	YES
Industry FE	NO	YES	NO	YES
Observations	35,337	24,604	34,837	24,502
Pseudo/Adj. R^2	0.0008	0.1209	0.0006	0.0116

In this table, we present the panel data regression estimates of the relation between the trade war exposure and abnormal stock return over 2018. The dependent variables are two measures of abnormal return, the excess return and DGTW abnormal return. The control variable consists of firm feature variables and factor loadings. The fixed effects (FE) used in each specification are at industry and month level and are noted in the table. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. R^2 values are given in the table. *$p < .1$; **$p < .05$; ***$p < .01$.

Based on these identifications, we label the trade war exposed industries, replace the key variable 'text-based exposure' with the trade war exposed industry dummy variable (*TradeWarInd*) and repeat the regression of the model (4). Table 7 shows a result similar to the result in Table 4 that the interaction terms are all positive and significant. These results suggest that our finding persists using an alternative definition of trade war exposure. During the Sino-US trade war, exposed firms with a strong culture experienced a significantly smaller drop in abnormal returns than their exposed peers.

5. Mechanisms

Thus far, we have documented that a strong corporate culture helps alleviate the negative impact of the Sino-US trade war on firms' stock returns. In this section, we investigate potential channels through which a strong culture keeps firms resilient during the bear market. We conduct mediating effect tests following the procedure of Baron and Kenny (1986), which is widely used by financial scholars (e.g., Chen et al., 2021; Francis et al., 2021). Specifically, following Lai et al. (2023), we construct a recursive model to explore the influencing mechanisms. To estimate the statistical significance of the indirect effect, we follow Chen et al. (2021) and Xiong et al. (2021) and conduct the Sobel test in mediating effect. We identify two distinct mechanisms. These mechanisms are operating performance enhancement and financial constraints relieving.

First, we the channel of operating performance. Lins et al. (2017) and Li et al. (2021a) find that the operating performance is a mechanism behind the association between high-ESG performance or strong culture and higher stock return in crisis. We examine this channel by testing the mediating mechanism of two performance measures: profit margin (*ProfitMargin*) and earnings growth (*EarningGrowth*) proxying for the profitability and growth respectively. The results are shown in Panel A of Table 8. The coefficients are all positive and significant, indicating that the strong culture significantly promotes firm profitability and growth which in turn cause better stock performance.

Second, we examine the mediating effect of financial constraints relieving. The relationship between soft information and financial constraints relieving has been discussed in several studies. Wu et al. (2014) provide Chinese evidence that higher regional social trust helps local firms obtain more trade credit, an important source of financing. El Ghoul and Zheng (2016) point out that the four macro-level cultural dimensions constructed by Hofstede and Hofstede (2001) - individualism and collectivism, power distance, avoidance of uncertainty, masculinity, and femininity - can all affect the business credit supply decisions of enterprises. Soft information at firm level also relieves information ambiguity and convinces investors or credit providers (Lins et al., 2017), resulting in better financial status and stock performance.

We examine this channel by testing the mediating mechanism of two kinds of financial constraints measures. The first is trading credit (*TradeCredit*). The results are in the columns (1) and (2) in Panel B of Table 8. The coefficients are all positive and significant, indicating that the strong culture exhibits more available trading credit and lower financial constraints which in turn relate to higher abnormal return of stocks.

Following the Buehlmaier and Whited (2018), the second measures are KZ Index (*KZ*) developed by Kaplan and Zingales (1997) and WW index (*WW*) developed by Whited and Wu (2006). *KZ* results are shown in columns (3) and (4) in Panel B of Table 8. The coefficient in columns (3) is negative and significant, indicating that the strong culture significantly negative associated with the KZ financial constraint index. The coefficients in column (4) are positive for culture score variable and negative for KZ Index variable, indicating that stock performance increase with lower financial constraints. For robustness checking, the mediating effect of *WW* is also examined, and the results is similar to those of *KZ*.

Table 8
Mechanisms analyses.

Panel A: the operating performance enhancement channel				
	(1)	(2)	(3)	(4)
VARIABLES	ProfitMargin	DGTWReturn	EarningGrowth	DGTWReturn
Culture	0.0062***	0.0032***	0.1636**	0.0021*
	(0.0021)	(0.0011)	(0.0736)	(0.0012)
ProfitMargin		0.054***		
		(0.0100)		
EarningGrowth				0.0015***
				(0.0003)
Indirect effect	0.0003	0.0002		
Sobel test	2.5580**	2.0230**		
FirmCharacteristics	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Observations	2753	2753	2787	2787
Pseudo/Adj. R^2	0.4868	0.0930	0.2865	0.0513
Panel B: the financial constrains reduction channel				
	(1)	(2)	(3)	(4)
VARIABLES	TradeCredit	DGTWReturn	KZ	DGTWReturn
Culture	0.0018***	0.0038**	−0.0441***	0.0031***
	(0.0004)	(0.0012)	(0.0116)	(0.0012)
TradeCredit		0.1323***		
		(0.0579)		
KZ				−0.0055***
				(0.0019)
Indirect effect	0.0002	0.0002		
Sobel test	2.0400**	2.2700**		
FirmCharacteristics	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Observations	2709	2709	2636	2636
Pseudo/Adj. R^2	0.3796	0.0461	0.4495	0.0807

This table presents the results of the mechanism tests of the effect of corporate culture on abnormal returns. The dependent variable is the DGTW abnormal return, and the mediator variables are profit margin (*ProfitMargin*), earning growth (*EarningGrowth*), trading credit (*TradeCredit*), financial constraints Index (*KZ*). The key independent variables are the corporate culture score (*CultureScore*) and mediator variables. The control variables are the firm characteristics variables and the factor loadings. The fixed effects (FE) used in each specification are at the industrial level. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. R^2 values are given in the table. *p < .1; **p < .05; ***p < .01.

Table 9
Comparisons of the mean corporate culture scores between SOE and POE.

Culture	Group	Number of Observations	Mean	Diff
		(1)	(2)	(3)
Overall	POE	22,186	5.4556	0.6400***
	SOE	12,109	6.0956	
Integrity	POE	22,186	5.6273	0.4951***
	SOE	12,109	6.1224	
Innovation	POE	22,186	5.2531	0.7557***
	SOE	12,109	6.0088	
Hardworking	POE	22,186	5.0213	1.4101***
	SOE	12,109	6.4314	
Quality	POE	22,186	5.8162	−0.8394***
	SOE	12,109	4.9768	
Teamwork	POE	22,186	5.4036	0.2854***
	SOE	12,109	5.6890	

This table compares the mean corporate culture scores between the POE and SOE subgroups in the *t*-test. The results of overall and individual cultures are all presented in this table. Column (3) presents the difference between mean values and the p-statistics of the t-test with the hypothesis that the mean value in the POE group is not equal to the value in the SOE group. *$p < .1$; **$p < .05$; ***$p < .01$.

Table 10
Test in groups: SOE and POE.

Panel A: the Sino-US trade war exposure and abnormal stock returns: SOE and POE				
VARIABLES	ExcessReturn		DGTWReturn	
	POE	SOE	POE	SOE
	(1)	(2)	(3)	(4)
CultureScore	0.0036**	−0.0021	0.0052**	−0.0033
	(0.0018)	(0.0024)	(0.0024)	(0.0031)
FirmCharacteristics	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Observations	1828	919	1805	913
Pseudo/Adj. R^2	0.1725	0.3657	0.1595	0.3352
Panel B: the effect of the corporate culture: SOE and POE				
VARIABLES	DGTWReturn			
	POE	SOE	POE	SOE
	(1)	(2)	(3)	(4)
TradeWar	−0.0322***	−0.0160	−0.0384***	−0.0169
	(0.0104)	(0.0109)	(0.0119)	(0.0111)
TradeWar × CultureScore	0.0032**	0.0015	0.0040**	0.0020
	(0.0016)	(0.0017)	(0.0018)	(0.0017)
FirmCharacteristics	NO	NO	YES	YES
FactorLoadings	NO	NO	YES	YES
Month FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Observations	22,947	11,919	14,983	9954
Pseudo/Adj. R^2	0.0026	0.0144	0.0250	0.0386

Panel A in this table presents cross-sectional data regressions that estimate the relation between trade war exposure and abnormal returns under the subgroups of SOE and POE over 2018. Panel B presents regression estimates of panel data on the relation between the interaction term consisting of trade war exposure and culture score and abnormal stock return under the subgroups of SOE and POE over 2018. The dependent variables are two measures of abnormal return, the excess return and DGTW abnormal return. The key independent variable is the trade war exposure proxied by the textual analysis from analyst reports in panel A and is the interaction term consisting of the trade war exposure and culture score in panel B. The control variables are the firm feature variables and the factor loadings. In panel A, industry fixed effects (FE) are used. The fixed effects (FE) used in each specification are at the firm and month level in panel B. Standard errors consistent with Heteroscedasticity are clustered at the firm level and reported in parentheses. R^2 values are given in the table. *p < .1; **p < .05; ***p < .01.

6. The heterogenous impacts on SOEs and POEs

It is recognized that government officials exercise control over state-own enterprises (SOEs) for their own objects (Shleifer and Vishny, 1994; Shleifer, 1998) rather than maximizing shareholder value. Therefore, corporate governance in the SOEs, including corporate culture development, can be intervened by the government for political purposes. In China, SOE is essential to the economy and accounted for over 60% of market capitalization in 2019. Xie et al. (2022) point out that SOEs in China have an alternative model of governance compared to private-owned enterprises (POE), for example, SOEs may legitimize a governing system that authorizes the government over the board of directors. Moreover, the main incentive for SOE managers is the chance of promotion to higher-level government positions after tenure rather than the payment or performance bonuses, a motivation that essentially eliminates the need for incentive-based compensation at SOEs (Jiang and Kim (2015)). Consequently, rather than promoting the firm performance, the managers in Chinese SOEs are more likely to employ the corporate culture to achieve political goals, such as policy response or propaganda.

We therefore examine the heterogeneity of the mitigation effects of strong corporate culture to the negative impact of the trade war on the firm valuation across the SOEs and POEs. The comparison of corporate cultures between POEs and SOEs is reported in Table 9. The culture scores in all dimensions in SOEs are higher than in POEs, except for the cultural value of "Product and Service Quality" (see columns (2) and (3)). The differences in each cultural value between SOEs and POEs are all significant at the 1% level, in column (3).

We run the regressions in the specification of eqs. (2) and (4) for SOEs and POEs respectively. Results in Table 10 show that POEs with a strong culture performed significantly better than SOEs with strong culture during the crisis period. These results suggest that a strong corporate culture matters only for POEs but not for SOEs during the trade war.

To understand how a strong culture helps firms during the trade war, we further examine the contribution of each individual corporate cultural value to the resilience of SOEs and POEs in the trade war. Panel A of Table 11 shows that the coefficients of interaction terms with the score of cultures of "Product and Service Quality", "Hardworking and Performance", and "Innovation and Technology" are positive and significant, while the coefficients of interaction terms with the cultures of "Integrity and Honesty" and "Teamwork and Cooperation" are positive but not significant. These results suggest that the company's cultures of improvement of product or service, creativity, and firm performance are the keys to resilience during the trade war. Panel B shows the results of POEs. The results are comparable to those in panel A except that the coefficients in Panel B of the interaction term with the "Teamwork and

Table 11
Tests of impact of individual cultures.

Panel A: Corporate culture and abnormal stock returns: single cultures					
VARIABLES	DGTWReturn				
	(1)	(2)	(3)	(4)	(5)
TradeWar	−0.0243**	−0.0258***	−0.0295***	−0.0332***	−0.0233***
	(0.0101)	(0.0086)	(0.0093)	(0.0074)	(0.0082)
TradeWar × Integrity	0.0020				
	(0.0016)				
TradeWar × Innovation		0.0022*			
		(0.0013)			
TradeWar × Hardworking			0.0028**		
			(0.0014)		
TradeWar × Quality				0.0037***	
				(0.0013)	
TradeWar × Teamwork					0.0019
					(0.0013)
FirmCharacteristics	YES	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES
Observations	25,907	25,907	25,907	25,907	25,907
Pseudo/Adj. R^2	0.0230	0.0230	0.0231	0.0232	0.0230
Panel B: Corporate culture and abnormal stock returns: single cultures (POE)					
VARIABLES	DGTWReturn				
	(1)	(2)	(3)	(4)	(5)
TradeWar	−0.0326**	−0.0436***	−0.0422***	−0.0550***	−0.0436***
	(0.0143)	(0.0128)	(0.0130)	(0.0125)	(0.0117)
TradeWar × Integrity	0.0025				
	(0.0023)				
TradeWar × Innovation		0.0044**			
		(0.0020)			
TradeWar × Hardworking			0.0043**		
			(0.0019)		
TradeWar × Quality				0.0059***	
				(0.0019)	
TradeWar × Teamwork					0.0044**
					(0.0020)
FirmCharacteristics	YES	YES	YES	YES	YES
FactorLoadings	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES
Observations	14,650	14,650	14,650	14,650	14,650
Pseudo/Adj. R^2	0.0266	0.0269	0.0269	0.0271	0.0269

This table presents the panel data regression estimates of the relation between the abnormal stock return and interaction term consisting of trade war exposure and individual culture score over 2018. Panel A presents the relation between abnormal return and interaction terms consisting with trade war exposure and individual culture scores for all samples. Panel B presents the results for subsample of POEs. The dependent variable is DGTW abnormal return. The key independent variable is the interaction terms consisting with trade war exposure and individual culture scores. The control variables are the firm feature variables and the factor loadings. The fixed effects (FE) used in each specification are at firm and month level and are noted in the table. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. R^2 values are given in the table. *p < .1; **p < .05; ***p < .01.

Cooperation" variable is also positive and significant and the coefficient of the term with "Innovation, and Technology" variable is positive and significant at 5% level instead of 10%. These results suggest that being creative and cooperative are more important for POEs in crisis than for SOEs.

7. Conclusion

In this research, we study whether a strong corporate culture can provide resilience and mitigate the negative impact of the Sino-US trade war on the listed Chinese companies. First, we introduce a new semi-supervised machine learning approach to generate a corporate culture dictionary in Chinese and obtain corporate culture measurement for the top-five most popular corporate culture values of the Chinese A-Share listed firms. Then, we quantify the corporate exposure to the Sino-US trade war using the lexicon method. We find that the firms exposed to the trade war significantly suffered adverse valuation effects in 2018.

Empirical analyses suggest that firms with stronger cultures have better stock performance in 2018, compared to the peers with weaker cultures, and the stronger culture help mitigate the negative impacts of trade war exposure. Two potential influencing

mechanisms are operating performance enhancement and financial constraint mitigation. Moreover, the corporate culture provides more resilience to POEs than SOEs in the trade war. Further analyses reveal that individual cultures of "Quality", "Hardworking", "Teamwork" and "Innovation" have more material effect on firm performance of POEs.

Our research has important implications. Firstly, the Sino-US trade war appears to be a severe economic burden for Chinese companies and jeopardizes the sustainable development of these firms, especially those exposed to the trade war during 2018. Secondly, we provide evidence that corporate culture helps mitigate such negative impact and achieve more sustainable future, and POEs benefit most from a strong corporate culture. Thus, Chinese private firms should build a strong corporate culture to promote sustainable development and business growth during the trade war.

Author statement

Sirui Cheng: Ideation; Data collection; Methodology; Formal analysis; Writing – first drafting.
Xiuping Hua: Ideation; Writing – Redrafting, Reviewing and Editing; Funding acquisition; Investigation; Paper Submission.
Qingfeng Wang: Methodology, Writing – Redrafting, Reviewing and Editing, Validation.

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Appendix A Variables definitions

Variable	Definition
Variables of corporate culture	
CultureScore	The culture score level aggregated from the culture scores level of innovation, integrity, teamwork, and honest, in 2016.
Integrity	The culture score of integrity and honesty.
Innovation	The culture score of innovation and technology.
Hardworking	The culture score of hardworking and performance.
Quality	The culture score of product and service quality.
Teamwork	The culture score of teamwork and cooperation.
Variables of the trade war exposure	
TradeWar	The trade war exposure variable equals to 1 if the analyst reports for a specific firm in specific month have the sentence containing the words of trade war.
TradeWar_Count	The trade war exposure variable equals to the ratio of the number of sentences containing the words of trade war to number of all sentences in the analyst reports for a specific firm in specific month, taking logarithm.
Control variables	
ROE	Earning return divided by the total equity.
Size	The amount of market size of stock, taking logarithm.
Leverage	Debt to equity ratio.
Tobin's Q	The market value of a company divided by its assets' replacement cost.
SalesGrowth	The growth of sales.
FixedGrowth	The growth of fixed asset.
CEOChair	A dummy variable equals to 1 if CEO is not the Chairman of board.
BoardIndependence	Fraction of board consisting of independent director.
BoardSize	The number of members of board.
BoardOwnership	Fraction of outstanding shares owned by board members.
Variables for validating the corporate culture scores	
EarningsManagement	The degree of real earnings management
Fault	The number of times that the firm violated regulation and punishment by the regulators
R&D	The ratio of research and development expense amount to total asset
Patents	The number of patents
EarningGrowth	The percentage change of earnings
LawSuit	The number of lawsuits related to the business contract
ISO9001	The pass of ISO9001 (dummy variable)
JointVenture	The number of joint ventures that the firm has participated in

Appendix B Validating our measure of the corporate culture

VARIABLES	EarningsManagement	Fault	R&D	Patents	EarningGrowth	LawSuit	ISO9001	JointVenture
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Integrity	−1.0941**	−3.1798***						
	(0.4883)	(0.6583)						
Innovation			0.2257***	12.6757***				
			(0.0226)	(1.8012)				
Hardworking					0.7765***			
					(0.1449)			
Quality						−4.5137***	20.4824***	
						(0.8523)	(3.8168)	
Teamwork								74.6280***
								(20.9120)
ROE	−0.7183***	−1.0273***	0.0340***	0.7087***	0.0940***	−0.5579***	0.6084	−3.9220***
	(0.0387)	(0.0679)	(0.0033)	(0.1873)	(0.0130)	(−9.10)	(0.3926)	(1.1054)
Size	0.0022	−0.0184***	−0.0011***	0.1026***	−0.0028***	−0.0260***	−0.0501*	2.9059***
	(0.0020)	(0.0029)	(0.0002)	(0.0160)	(0.0005)	(−4.37)	(0.0266)	(0.1547)
Leverage	0.0190	0.1162***	−0.0058***	−0.0934	0.0093**	0.3721***	−0.1606	−1.9003***
	(0.0127)	(0.0216)	(0.0012)	(0.0752)	(0.0040)	(8.39)	(0.1643)	(0.5546)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	20,558	22,847	22,847	22,847	19,362	22,847	21,295	16,262
Pseudo/Adj. R^2	0.0872	0.0578	0.3776	0.0643	0.0280	0.0690	0.0543	0.2923

This table validates our main measure of corporate values based on the *Discussion and Analysis of the Operation* section of the annual report, from 2012 to 2020. In columns (1) to (2), *EarningManagement* and *Fault* are used for validating the culture score of "Integrity and Honesty". In columns (3) and (4), *R&D* and *Patents* are used for validating the culture score of "Innovation and Technology". In column (5), *EarningGrowth* is used for validating the culture score of "Hardworking and Performance". In columns (6) and (7), *LawSuit* and *ISO9001* are used for validating the "Product and Service Quality". In column (8), *JointVenture* is used for validating the culture score of "Teamwork and Cooperation". Logistic regressions are used for dummy dependent variable, in column (7). Industry fixed effects (FE) are used. R^2 values are given. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. *p < .1; **p < .05; ***p < .01.

Appendix C List of the words of the Sino-US Trade War

Words of Sino US Trade War (in English)	Words of Sino US Trade War (in English)
"Double Reverse" investigation	Sino US trade friction
301 Investigation	Sino US trade disputes
337 Investigation	Sino US trade relations
American "double reverse"	Tariff
American ITC	Trade agreement
Anti-dumping investigation	Trade conflict
Anti-trust investigation	Trade dispute
Countervailing investigation	Trade friction
Federal register	Trade investigation
Federal Trade Commission	Trade protection
Protectionism	Trade protectionism
Protective tariff	Trade remedy
Punitive tariff	Trade sanctions
Retaliatory tariff	Trade War
Section 301	Great Trade War
Sino US conflict	Trump administration
Sino US economic and trade	Unfair trade
Sino US friction	US Department of Commerce
Sino US trade	American Government Department of Commerce
Sino US trade disputes	US export regulations

Appendix D Validating our measure of the Sino-US trade war exposure

Variables	TradeWar					
	(1)	(2)	(3)	(4)	(5)	(6)
Export	0.0636***	0.0602***	0.0422***			
	(0.0050)	(0.0060)	(0.0070)			

(*continued on next page*)

(*continued*)

Variables	TradeWar					
	(1)	(2)	(3)	(4)	(5)	(6)
Import				0.0734***	0.0635***	0.0399***
				(0.0056)	(0.0067)	(0.0075)
Controls	NO	YES	YES	NO	YES	YES
Industry FE	NO	NO	YES	NO	NO	YES
Observations	4604	3141	3140	4604	3141	3140
Pseudo/Adj. R^2	0.0332	0.1165	0.1940	0.0344	0.1142	0.1913

This table validates our main measure of the Sino-US trade war exposure based on the analyst report. Columns (1) to (3) show the association between the export amount from 2015 to 2016 and the trade war exposure from 2017 to 2020 for the listed firms. Columns (4) to (7) show the association between import amounts from 2015 to 2016 and the trade war exposure from 2017 to 2020 for the listed firms. Logistic regressions are used in these regressions. Industry fixed effects (FE) are used. R^2 values are given. Heteroscedasticity-consistent standard errors are clustered at the firm level and reported in parentheses. *p < .1; **p < .05; ***p < .01.

References

Algan, Y., Cahuc, P., 2010. Inherited trust and growth. Am. Econ. Rev. 100 (5), 2060–2092.
Amiti, M., Redding, S.J., Weinstein, D.E., 2019. The impact of the 2018 tariffs on prices and welfare. J. Econ. Perspect. 33 (4), 187–210.
Amiti, M., Redding, S.J., Weinstein, D.E., 2020, May. Who's paying for the US tariffs? A longer-term perspective. In: AEA Papers and Proceedings, 110, pp. 541–546.
Baker, S.R., Bloom, N., Davis, S.J., 2016. Measuring economic policy uncertainty. Q. J. Econ. 131 (4), 1593–1636.
Barney, J.B., 1986. Organizational culture: can it be a source of sustained competitive advantage? Acad. Manag. Rev. 11 (3), 656–665.
Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J. Pers. Soc. Psychol. 51 (6), 1173.
Bellstam, G., Bhagat, S., Cookson, J.A., 2021. A text-based analysis of corporate innovation. Manag. Sci. 67 (7), 4004–4031.
Benguria, F., Choi, J., Swenson, D.L., Xu, M.J., 2022. Anxiety or pain? The impact of tariffs and uncertainty on Chinese firms in the trade war. J. Int. Econ. 137, 103608.
Bertrand, M., Schoar, A., 2003. Managing with style: the effect of managers on firm policies. Q. J. Econ. 118 (4), 1169–1208.
Besedes, T., Kohl, T., Lake, J., 2020. Phase out tariffs, phase in trade? J. Int. Econ. 127, 103385.
Bonfatti, R., 2017. The sustainability of empire in a global perspective: the role of international trade patterns. J. Int. Econ. 108, 137–156.
Bown, C.P., Kolb, M., 2022. Trump's Trade War Timeline: An up-to-Date Guide.
Buehlmaier, M.M., Whited, T.M., 2018. Are financial constraints priced? Evidence from textual analysis. Rev. Financ. Stud. 31 (7), 2693–2728.
Caldara, D., Iacoviello, M., 2022. Measuring geopolitical risk. Am. Econ. Rev. 112 (4), 1194–1225.
Caldara, D., Iacoviello, M., Molligo, P., Prestipino, A., Raffo, A., 2020. The economic effects of trade policy uncertainty. J. Monet. Econ. 109, 38–59.
Chen, D., Newburry, W., Park, S.H., 2009. Improving sustainability: an international evolutionary framework. J. Int. Manag. 15 (3), 317–327.
Chen, J., Chen, X., Hou, Q., Hu, M., 2021. Haste doesn't bring success: top-down amplification of economic growth targets and enterprise overcapacity. J. Corp. Finan. 70, 102059.
Chui, A.C., Titman, S., Wei, K.J., 2010. Individualism and momentum around the world. J. Financ. 65 (1), 361–392.
Crowley, M.A., 2006. Do safeguard tariffs and antidumping duties open or close technology gaps? J. Int. Econ. 68 (2), 469–484.
Daniel, K., Grinblatt, M., Titman, S., Wermers, R., 1997. Measuring mutual fund performance with characteristic-based benchmarks. J. Financ. 52 (3), 1035–1058.
El Ghoul, S., Zheng, X., 2016. Trade credit provision and national culture. J. Corp. Finan. 41, 475–501.
Eun, C.S., Wang, L., Xiao, S.C., 2015. Culture and R2. J. Financ. Econ. 115 (2), 283–303.
Fisman, R., Hamao, Y., Wang, Y., 2014. Nationalism and economic exchange: evidence from shocks to sino-japanese relations. Rev. Financ. Stud. 27 (9), 2626–2660.
Francis, B., Hasan, I., Liu, L., Wu, Q., Zhao, Y., 2021. Financial analysts' career concerns and the cost of private debt. J. Corp. Finan. 67, 101868.
Glick, R., Taylor, A.M., 2010. Collateral damage: trade disruption and the economic impact of war. Rev. Econ. Stat. 92 (1), 102–127.
Graham, J.R., Grennan, J., Harvey, C.R., Rajgopal, S., 2022. Corporate culture: evidence from the field. J. Financ. Econ. 146 (2), 552–593.
Grennan, J., 2019. A Corporate Culture Channel: How Increased Shareholder Governance Reduces Firm Value (Working paper).
Guiso, L., Sapienza, P., Zingales, L., 2003. People's opium? Religion and economic attitudes. J. Monet. Econ. 50 (1), 225–282.
Guiso, L., Sapienza, P., Zingales, L., 2008. Trusting the stock market. J. Financ. 63 (6), 2557–2600.
Guiso, L., Sapienza, P., Zingales, L., 2009. Cultural biases in economic exchange? Q. J. Econ. 124 (3), 1095–1131.
Guiso, L., Sapienza, P., Zingales, L., 2015. The value of corporate culture. J. Financ. Econ. 117 (1), 60–76.
Han, P., Jiang, W., Mei, D., 2022. Mapping US-China Technology Decoupling, Innovation, and Firm Performance (Working paper).
Hassan, T.A., Hollander, S., Van Lent, L., Tahoun, A., 2019. Firm-level political risk: measurement and effects. Q. J. Econ. 134 (4), 2135–2202.
Hassan, T.A., Hollander, S., Van Lent, L., Schwedeler, M., Tahoun, A., 2020a. Firm-Level Exposure to Epidemic Diseases: Covid-19, SARS, and H1N1 (No. w26971). National Bureau of Economic Research working paper.
Hassan, T.A., Hollander, S., Van Lent, L., Tahoun, A., 2020b. The Global Impact of Brexit Uncertainty (No. w26609). National Bureau of Economic Research working paper.
Hofstede, G.H., Hofstede, G., 2001. Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations. Sage.
Hofstede, G., Neuijen, B., Ohayv, D.D., Sanders, G., 1990. Measuring organizational cultures: a qualitative and quantitative study across twenty cases. Adm. Sci. Q. 286–316.
Huang, A.H., Lehavy, R., Zang, A.Y., Zheng, R., 2018. Analyst information discovery and interpretation roles: a topic modeling approach. Manag. Sci. 64 (6), 2833–2855.
Huang, Y., Lin, C., Liu, S., Tang, H., 2019. Trade Networks and Firm Value: Evidence from the US-China Trade War (Working paper).
Itakura, K., 2020. Evaluating the impact of the US–China trade war. Asian Econom. Pol. Rev. 15 (1), 77–93.
Jiang, F., Kim, K.A., 2015. Corporate governance in China: a modern perspective. J. Corp. Finan. 32, 190–216.
Kaplan, S.N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? Q. J. Econ. 112 (1), 169–215.
Kreps, D.M., 1990. Corporate culture and economic theory. Perspect. Posit. Polit. Econ. 90 (109–110), 8.
Lai, K.M., Khedmati, M., Gul, F.A., Mount, M.P., 2023. Making honest men of them: institutional investors, financial reporting, and the appointment of female directors to all-male boards. J. Corp. Finan. 78, 102334.
Li, K., Liu, X., Mai, F., Zhang, T., 2021a. The role of corporate culture in bad times: evidence from the COVID-19 pandemic. J. Financ. Quant. Anal. 56 (7), 2545–2583.
Li, K., Mai, F., Shen, R., Yan, X., 2021b. Measuring corporate culture using machine learning. Rev. Financ. Stud. 34 (7), 3265–3315.

Lins, K.V., Servaes, H., Tamayo, A., 2017. Social capital, trust, and firm performance: the value of corporate social responsibility during the financial crisis. J. Financ. 72 (4), 1785–1824.
Liu, J., Stambaugh, R.F., Yuan, Y., 2019. Size and value in China. J. Financ. Econ. 134 (1), 48–69.
Loughran, T., McDonald, B., 2011. When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. J. Financ. 66 (1), 35–65.
Mikolov, T., Sutskever, I., Chen, K., Corrado, G.S., Dean, J., 2013. Distributed representations of words and phrases and their compositionality. Adv. Neur. In. 26.
Nunn, N., 2008. The long-term effects of Africa's slave trades. Q. J. Econ. 123 (1), 139–176.
O'Reilly, C.A., Chatman, J.A., 1996. Culture as Social Control: Corporations, Cults, and Commitment.
Pursiainen, V., 2022. Cultural biases in equity analysis. J. Financ. 77 (1), 163–211.
Sautner, Z., van Lent, L., Vilkov, G., Zhang, R., 2020. Firm-Level Climate Change Exposure. Working Paper.
Schein, E.H., 1990. Organizational culture: What it is and how to change it. In: Human Resource Management in International Firms. Palgrave Macmillan, London, pp. 56–82.
Shleifer, A., 1998. State versus private ownership. J. Econ. Perspect. 12 (4), 133–150.
Shleifer, A., Vishny, R.W., 1994. Politicians and firms. Q. J. Econ. 109 (4), 995–1025.
Song, Y., Shi, S., Li, J., Zhang, H., 2018, June. Directional skip-gram: explicitly distinguishing left and right context for word embeddings. In: Proceedings of the 2018 conference of the north American Chapter of the Association for Computational Linguistics: Human Language Technologies, 2, pp. 175–180.
Sørensen, J.B., 2002. The strength of corporate culture and the reliability of firm performance. Adm. Sci. Q. 47 (1), 70–91.
Talhelm, T., Zhang, X., Oishi, S., Shimin, C., Duan, D., Lan, X., Kitayama, S., 2014. Large-scale psychological differences within China explained by rice versus wheat agriculture. Science. 344 (6184), 603–608.
Wang, Y., Chen, J., 2013. Differences of English and Chinese as written languages and strategies in English writing teaching. Theor. Pract. Lang. Stud. 3 (4).
Wang, Y., Wang, Y., Lee, S.H., 2017. The effect of cross-border e-commerce on China's international trade: an empirical study based on transaction cost analysis. Sustainability. 9 (11), 2028.
Weber, M., 1930. The Protestant Ethic and the Spirit of Capitalism, Tr. Talcott Parsons, vol. 1. Charles Scribner's Sons, New York, p. 0.
Whited, T.M., Wu, G., 2006. Financial constraints risk. Rev. Financ. Stud. 19 (2), 531–559.
Wu, W., Firth, M., Rui, O.M., 2014. Trust and the provision of trade credit. J. Bank. Financ. 39, 146–159.
Xie, S., Lin, B., Li, J., 2022. Political control, corporate governance and firm value: the case of China. J. Corp. Finan. 72, 102161.
Xiong, J., Ouyang, C., Tong, J.Y., Zhang, F.F., 2021. Fraud commitment in a smaller world: evidence from a natural experiment. J. Corp. Finan. 70, 102090.
Xu, Z., Li, Y., Chau, S.N., Dietz, T., Li, C., Wan, L., Zhang, J., Zhang, L., Li, Y., Chung, M.G., Liu, J., 2020. Impacts of international trade on global sustainable development. Nat. Sus. 3 (11), 964–971.
Zuckerman, A., 2002. Strong corporate cultures and firm performance: are there tradeoffs? Acad. Manag. Perspect. 16 (4), 158–160.