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The Impact of Import Competition on CEO Emotions: Insights from Earnings Conference Calls 2012-2020

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In recent years, in response to the effects of foreign trade competition, the United States Government has implemented a number of protective trade policies restricting the importation of certain foreign goods, with the purpose of protecting its firms and domestic economy. Also considering the crucial role and profound influence of Chief executive officers (CEOs) in their organizations, we aim to analyze the impact of government policies and international import competition on the CEOs' attitudes in their public communications. We further analyze the effects of CEO characteristics and firm characteristics on the sentiments of CEO public communications. Based on our analysis of the transcripts of both the CEO speeches and Q&A sessions from the U.S. S&P 500 and S&P 600 corporations between 2012 and 2020, we have found a substantial correlation between the sentiment expressed in these speeches and the import penetration faced by the firm. We identify 4 main findings: firstly, facing accelerated import competition from China, US firms have expressed more negative sentiments toward topics related to China. Such a deterioration in tone becomes more significant during the Q&A session. Second, large companies, that have closer business relationships with China, have shown larger shifts in attitude toward import competition from China. Third, the sentiment of CEOs turns to be more negative, as they take on more firm responsibilities, being older in age, and when their firm has higher annual stock returns. Fourth, the punitive trade tariffs and other trading policies cause CEO sentiment to worsen with regard to imports from China, especially after the trade war.

Keywords: Sentiments of Earnings Conference Call, Import Competition, Textual Analysis, US-China Trade War

1. Introduction

After China and the United States issued the Joint Communiqué of the People's Republic of China on December 16, 1978, China and the US established diplomatic relations for over 45 years. Currently, China and the US stand as two of the world's largest economies, wielding significant influence in the global industrial chain (Deng, 2021). China is one of the U.S.'s largest trading partners. However, the US imports far more goods from China than it exports to China[1]. In response, the U.S. government has enacted trade restriction policies aimed at safeguarding local economies. This research explores the dynamics of economic competition between the U.S. and China, focusing on how the substantial increase in trade deficit has shifted U.S. perspectives toward Chinese imports.

A large international trade literature has documented answers to the question regarding the impacts of import competition on the US local economy. Higher import competition can reduce the job openings in the U.S. labor market (David Riker, 2022; Asquith et al., 2019), increase the unemployment rate (Autor et al., 2013; Acemoglu et al., 2015; Lu et al.,2018), reduce worker's income (Autor et al., 2014), and lead to a worse local labor market conditions (Autor et al., 2013; David Riker, 2022).

However, the restrictive trade policies implemented by the US government in recent years continue to be debated among scholars, particularly concerning whether the restrictions on imports would help the U.S. economy develop. According to Hopewell (2022), managing the trade conflict between the US and China is just one of the twin challenges currently confronting the multilateral trading system. On the other hand, Ivanova (2019) showed that, with the growing deficits, the U.S.

[1] Based on the data from the Office of the United States Trade Representative, the U.S. goods trade deficit with China was $382.3 billion in 2022, an 8.3 percent increase ($29.4 billion) over 2021. According to data from Bloomberg, the number of imports from China has been at least 2.8 times greater than the amount of U.S. exports in the last 15 years.

economic structure has transformed from traditional manufacturing of tradable goods to providing services since the early 2000s. This shift highlights a significant transformation in the American job market and the employment structure, concentrating growth in lower-paying positions. Despite the lack of consensus on the effect of import competition on the American local economy, the U.S. government has implemented various punitive restrictive policies aimed at minimizing the increase of the trading competition between the two countries to protect and support the development of local economies since the U.S. government realized the huge trade deficit.

The existing literature has a main gap that needs to be addressed. Primarily, most studies focus on the industry level, indicating that imports from China could influence U.S. plant closures (Bernard et al., 2006), institution closures (Asquith et al.,2019), and changing product portfolios to stifle innovation (Autor et al., 2016). Due to data limitations, these studies often overlook the nuanced impacts at the company level, especially the effect of import competition on corporations. However, the influx of imported products will directly compete with local goods, leading to a significant loss of market share for local businesses. Consequently, this will impede local enterprises from efficiently cutting production costs or improving productivity. Additionally, relying too heavily on imports could heighten vulnerability to external market shifts and policy changes, potentially leading to increased import expenses and a weakening of supply chain reliability. Therefore, neglecting to investigate the impact of import competition from the firm-level would, to a certain extent, underestimate its influence on the local businesses and industrial value chains. Hence, this study contributes to the current literature by delving into the firm-level influences of import competition, emphasizing a better understanding of the corporate strategies and decision-making processes under import competition.

Furthermore, although a few scholars have studied the reactions of companies using some firm-level data, such as financial reports (Kavitha et al., 2016), analysts' reports, and annual reports (Mohamad et al., 2019), they failed to adopt an ex-ante view when analyzing the potential effects of trade policies on firms' future dynamic business strategies. Specifically, we argue that the financial data of companies, as used in previous studies, exhibit a certain delay, as they only reflect the business conditions for the past fiscal year. Additionally, due to their standardized format, these annual reports are somewhat constrained in reflecting the future business strategies of companies. The use of regulated financial data may lead to an underestimate of the impact of macroeconomic policy changes on firms' strategic adjustments, thus impeding these studies from comprehensively assessing firms' responses and resilience to dynamic market changes. To overcome this limitation, we made another contribution by studying the sentiments and contents of CEOs' public speeches during the firms' earnings conference calls. We argue that CEOs' real-time speeches are more reflective of their firms' positions and strategies in showing their reactions to political changes and major economic events.

Lastly, only a few studies have examined CEO speeches on earnings conference calls. These studies have delved into various CEO characteristics and their emotional attitudes by examining their public speeches and media reports, aiming to understand the influence of different management features on company decision-making, such as narcissistic CEOs like to engage in intensive research and development (Hirshleifer et al, 2012) and large-scale acquisitions (Chatterjee et al, 2007). As far as we are aware, this work will pioneer a unique perspective on the study of U.S. firms' operations by introducing a new exogenous factor, specifically the import competition from international trade, to better explain the change in attitudes of CEOs in public speeches. This not only expands traditional research on business decision-making, but also

provides a new approach to understanding and assessing the impact of import competition on firm-level business performance.

To accurately reflect the latest market dynamics and policy shifts, this study analyzes the quarterly earnings conference call transcripts from 1100 firms across both the S&P 500 and S&P 600 index between 2012 and 2020[2]. Adopting Lu et al. (2018) methodology, we construct sentiment indices based on CEOs' speeches about China, aiming to track shifts in their attitudes toward business operations in China. This research first utilizes Python for the textual extraction of China-related sentences. Then, we employ the Linguistic Inquiry Word Count (LIWC)[3], an advanced artificial intelligence technology, to conduct a nuanced sentiment analysis (Mushtaq et al., 2022; Tausczik et al., 2010; Kennedy et al., 2021; Wujec, 2021). In conjunction with specialized dictionaries, we evaluate and score the sentiment conveyed in the CEOs' speeches, thereby establishing a core sentiment metric on China.

This paper presents the following main conclusions. Firstly, it demonstrates that in the face of accelerated import competition from China, US firms exhibit more negative sentiments toward topics related to China. This deterioration in speaking tone becomes particularly pronounced during Q&A sessions. Secondly, our research aims to investigate how various firm and CEO characteristics influence their sentimental responses to import competition through heterogeneity analysis. We examine the impact of CEO's age and duality, as well as firm's annual return and size on their sentiments toward China. Results showed that larger companies with closer business ties to China tend to show a more significant shift in attitude toward import competition from China.

[2] Given the significant impact of the Coronavirus disease (COVID-19) pandemic on global business operations from 2020 to the present, we have opted to focus exclusively on data collected before 2020 to minimize the pandemic's effects on our analysis.

[3] The Linguistic Inquiry Word Count (LIWC) is a computerized text analysis tool that quantifies psychologically significant word classes for the study of everyday language, enabling the analysis of extensive textual data (Tausczik et.al., 2010).

Additionally, CEO sentiments tend to become more negative as they take on more firm responsibilities, higher age, and as their firm achieves higher annual stock returns. Lastly, the US-China trade war has exacerbated CEO sentiment regarding imports from China. Overall, these findings deepen our understanding of CEO decision-making dynamics in response to external market challenges, offering valuable insights for policymakers regarding the effect of trade deficits on local businesses, while also providing valuable information for managers on corporate strategic planning.

The structure of this paper is organized as follows: Section 2 discusses the methodology of our research. Section 3 summarizes the data. Section 4 presents the empirical models and main findings. Finally, section 5 concludes the paper.

2. Methodology

2.1 Linguistic Inquiry and Word Count (LIWC)

This study utilizes earnings conference call transcript data from 1100 corporations spanning from 2012 to 2020 to construct a sentiment index reflecting CEOs' attitudes, especially regarding discussions about China. By employing natural language processing techniques (Lu et al., 2018) and integrating machine learning textual analysis methods (Mushtaq et al., 2022; Tausczik et.al., 2010; Kennedy et al, 2021; Wujec, 2021), we develop this sentiment metric. After collecting all transcripts, the data is processed with Python to extract segments related to China from the CEOs' speeches. We capture 40 words before and after "China" or “Chinese”, a total of 81 words for each segment, for further sentiment analysis.

Next, we use the LIWC, a textual analysis program, to count psychologically meaningful words under each word category. LIWC has been widely used to analyze large amounts of textual

data and relate language use to a variety of psychological processes and behaviors, such as attentional focus, affectivity, social relationships, thinking styles, and individual differences (Tauscik et. al., 2021). LIWC calculates the percentage of words belonging to each sentiment category within a text as the emotional tone. Understanding the linguistic patterns exhibited in a CEO's speech provides us with valuable insights into the firm's future business strategies, thereby reflecting the firm-level reactions to external market shocks such as accelerated import competition, protective trade policies, and so on.

Table 1: Example of Vocabulary Lists with Positive, Negative, and Uncertain Sentiment

Tone	Example						
Positive	Accelerate	Astonishing	Effective	Endorsed	Noble	Satisfaction	Unbeatable
Negative	Barely	Hardly	Inaccessible	Rarely	Risky	Scarcely	Unreliable
Uncertain	Doubtful	Instability	Speculative	Tentative	Tumultuous	Unstable	Volatile

Specifically, we compiled a list of positive and negative keywords based on more than 100 standard English dictionaries in LIWC. A sample of words is provided in Table 1. Then, we utilized this keyword list to identify the frequency of positive and negative words in CEO speeches whenever China is mentioned in each quarterly earnings call from 2012 to 2020. One innovation of our work is that our keyword list was tested and validated against more than 100 built-in dictionaries created to capture people's social and psychological states, compared to Lu et. al. (2018) who only applied the Harvard IV-4 psychosocial dictionary to derive the sentiment vocabulary list to measure the media slant. Our expanded use of dictionaries enables us to reduce identification bias and increase study accuracy. Another contribution of this work is that, unlike Lu et. al. (2018) who only used negative sentiment to analyze the textual sentiment, we constructed both the positive and negative sentiment index to comprehensively measure the change in attitudes of CEOs on the earnings conference call.

2.2 Positive/Negative Sentiment

This study examined the changes in CEOs' attitudes in their public speeches when mentioning "China". We define the sentiments as an insight of their future business strategies with China and then reflecting their attitudes toward Chinese import competition and US trade policies, consistent with Tang et al. (2018), Mushtaq et al. (2022), and Wujec (2021).

To measure the attitudes toward China in CEO speech, we define the negative sentiment index ($Negative\ Ratio_{c,t}$) and positive sentiment index ($Positive\ Ratio_{c,t}$) regarding China in CEO speeches as follows:

$$Negative\ Ratio_{c,t} = \frac{Neg_{c,t}}{WC_{c,t}} \times 100 \quad (1)$$

$$Positive\ Ratio_{c,t} = \frac{Pos_{c,t}}{WC_{c,t}} \times 100 \quad (2)$$

where $Neg_{c,t}$ is the total negative word count in the speech transcript for US company c in year t. $WC_{c,t}$ represents the total word count of this extracted text. $Negative\ Ratio_{c,t}$ index measures the proportion of negative sentiment words in the total text contents. We use a similar function to evaluate the positive ratio in each speech text.[4]

2.3 Import Penetration

China-US trade friction is a widely debated issue as the US trade deficit with China has rapidly accelerated in recent decades. Trade liberalization or trade protectionism has become a controversial issue in the United States (Lu et. al., 2018). To analyze and measure the level of import competition from China faced by the US local industry, we reference Riker (2022), Acemoglu et. al. (2015), and Asquith et. al. (2019), define import penetration as the China shock

[4] For illustration, suppose we use LIWC to analyze an extracted speech, which contains 100 words in total, LIWC identifies 8 negative words and 12 positive words from the speech, then the negative ratio of this text is 8 percent, and 12 percent for positive ratio.

in the United State market, especially the local labor market. We follow the methodology of Autor et. al. (2013) to calculate the change of annual import penetration ($\Delta IP_{i,t}$) from China for each SIC-4 industry *i* in year *t*:

$$\Delta IP_{i,t} = \frac{\Delta M_{i,t}}{Y_{i,2012} + Imp_{i,2012} - Exp_{i,2012}} \quad (3)$$

where $Imp_{i,2012}$ and $Exp_{i,2012}$ are industry imports and industry exports in 2012, respectively. $Y_{i,2012}$ measures the total industry shipments in 2012. The denominator in (3) is the initial absorption in the industry. $\Delta M_{i,t}$ represents the growth of imports from China in the industry *i* in year *t*. All the above trade values have been standardized using 2012 as the base year since 2012 marks the beginning of our investigation period.

Since import penetration data for sic-4 are not available for some industries, such as financial, insurance, and service sectors, we refer to the methodology of Lu et al. (2018) and calculate the weighted average import competition for each county where the headquarters of American firms are located, treating it as the effective import competition for these firms. To obtain the county-level import penetration index, we aggregate the ΔIP of each industry using the industrial employment as weight:

$$County\_IP_{i,t} = \sum_{i=a}^{n} \frac{employment_{a,t}}{employment_{all,t}} \times \Delta IP_{a,t} \quad (4)$$

where industry *i* contains different local industries a, b, c, …, n. $\frac{employment_{a,t}}{employment_{all,t}}$ measures the weight of industry *a*'s employment within the total employment of that county.

3. Data

3.1 Earnings Conference Call Transcript

Earnings Conference Call is a teleconference or webcast hosted by a company's

management team. These calls are scheduled after the release of a company's quarterly or annual financial results. Each earnings call has two main sections: first, the CEO will make an open speech to all investors about the company's future prospectus and its past accomplishments; then, followed by a Q&A session for chief officers to answer questions from professional analysts and investors. The Earnings Conference Call data were collected for all firms in the S&P 500 (large capitalization index) and S&P 600 (small capitalization index), totaling 1100 firms, from the Bloomberg database. Then, we took the following steps to clean the transcript data. First, all non-US firms were eliminated based on the location of their headquarters. Second, firms with missing financial or CEO demographic data, and firms with inaccessible earnings call transcripts were excluded from our study. Last, considering the data limitation, we removed all firms with fewer than three years of public trading history.

Next, for each section in the conference call transcript, we used Python to extract speech segments of 81 words in length that mention China, encompassing 40 words before and after "China" or "Chinese". If China is mentioned multiple times in the same section, all extracted words will be combined into one big paragraph. Then, these extracted texts are imported into LIWC platform to compute both positive and negative sentiment scores. To align with the annual financial and trade data, we further aggregate the quarterly earnings call sentiments into annual data by taking averages.

Consequently, our final dataset consists of 1553 annual Earnings Call sentiments for 262 American public firms from 2012 to 2020. On average, China is mentioned 6.525 times per year during the CEO speech and 12.775 times per year during the Q&A.

3.2 Import Competition from China and Political Trend

The US-China import and export data is collected from 2012 to 2020 from the United

Nations Comtrade database[5]. These data cover the import and export volume between the US and mainland China, Hong Kong, Macao, and Taiwan for all SIC-4 industries. We further convert the trade data into real value using the PCE price index as the adjustor.

Table 2: Summary of Import Penetration at County-level

FIPS	State	County	County Import penetration
Top 5 counties:			
1061	AL	Geneva County	0.693
34017	NJ	Hudson County	0.171
6075	CA	San Francisco County	0.139
36061	NY	New York County	0.109
42077	PA	Lehigh County	0.081
Lowest 5 counties:			
1049	AL	DeKalb County	-0.003
8013	CO	Boulder County	-0.003
35028	NM	Los Alamos County	-0.008
42079	PA	Luzerne County	-0.012
48157	TX	Fort Bend County	-0.023

Based on Equations 2 and 3, we derived the Chinese import penetration index for each US SIC-4 industry each year. We then aggregated this industry-level import penetration index at the county level. The Federal Information Processing Standards (FIPS) code is used to identify counties and states[6]. Since the data of industry decomposition for each county is not available, we used the ratio of each industry's employment[7] within the total employment in that county as the weight to aggregate the import competition index. Table 2 shows counties with the top and lowest import penetration. Geneva County in Alabama has the highest county-level import penetration (0.693), while Fort Bend County in Texas has the lowest county-level import penetration (-0.023).

[5] Data is available on https://comtradeplus.un.org/ .

[6] FIPS codes, which vary in length from 4 to 5 digits, use the first two digits to denote the state and the subsequent 2 or 3 digits to represent the county. For instance, "1061" signifies that "10" corresponds to Alabama and "61" to Geneva County, while "34017" indicates "34" for New Jersey and "017" for Hudson County.

[7] Data of sector employment for each county is downloaded from the Central Planning Bureau (CPB) Customs database. However, the CPB industry data is coded with the North American Industry Classification System (NAICS), different from the coding system used in the Comtrade database. Hence, we used the Harmonized System (HS) as a bridge to match the SIC industry codes to the CPB industry codes. If one SIC is corresponding to more than one NAICS, we aggregate the employment of multiple NAICS sectors as the employment of this SIC sector.

3.3 Sentiment score

We used LIWC to analyze the positive and negative sentiments towards China expressed by firm executives in the CEO speech and Q&A session. The trend of positive and negative sentiments is illustrated in Figure 1 and further summarized in Table 3.

Figure 1: Trend of Sentiments and Import Penetration, 2012-2020

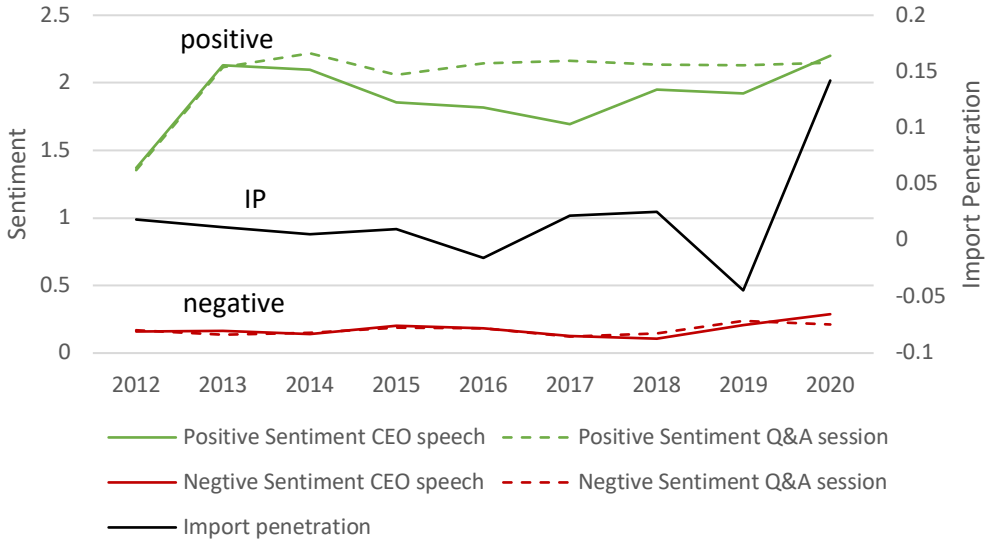

Figure 1 shows that the positive sentiment of the Q&A session exhibits a more pronounced inversed correlation with import penetration as compared to the sentiment of other sessions. Notably, there was a decline in import penetration between 2012 and 2016 as the positive sentiment in the Q&A session showed an inversed trend, which increased. Also, the CEO speech and Q&A showed a deteriorated sentiment from 2016 to 2017 when the import penetration increased. The negative sentiments of both the CEO speech and the Q&A session have shown a little fluctuation over the years, i.e. their trend lines are flatter than positive sentiments[8].

Furthermore, a concurrent downtrend in penetration was observed in 2019, and then there

[8] Negative sentiments are also tested against the import penetration. However, compared to the positive sentiment, the firm's negative sentiment ratio does not show any significant results. Hence, this analysis focuses solely on the empirical findings concerning positive sentiments. Details regarding negative sentiment outcomes are available upon request.

was a small peak in the positive sentiment in the Q&A session and both negative sentiments. In 2020, there was a significant increase in import penetration and positive sentiment in the CEO speech as the positive sentiment in the Q&A session decreased. Because President Trump started the trade war with China in 2018 and ended in 2020, therefore, its impact on import penetration and CEO attitudes in their public speeches are shown directly in Graph 1.

Table 3: Summary of Annual Import Penetration and CEO sentiments

		Positive Sentiment		Negative Sentiment	
Year	Import penetration	CEO speech	Q&A session	CEO speech	Q&A session
2012	0.019	1.37	1.354	0.16	0.167
2013	0.012	2.13	2.117	0.163	0.134
2014	0.006	2.098	2.219	0.142	0.149
2015	0.01	1.854	2.06	0.202	0.189
2016	-0.015	1.819	2.146	0.183	0.185
2017	0.022	1.694	2.161	0.124	0.122
2018	0.025	1.949	2.134	0.107	0.145
2019	-0.044	1.92	2.132	0.208	0.238
2020	0.142	2.2	2.147	0.288	0.212
Average	0.019	1.893	2.052	0.175	0.171

**High (Green) → Low (Red)*

From Table 3, the average import penetration is 0.019. Facing competition from China, American firms expressed 1.893 percent and 2.052 percent positive sentiments during the CEO speech and the Q&A session, respectively. Conversely, they exhibited 0.175 percent and 0.171 percent negative sentiments during these respective sections. Overall, compared to negative tones, the shift in positive sentiments appears to be a more significant indicator of the impact of import penetration.

3.4 Firm and CEO Characteristics

To study how the sentimental reactions of US firms facing import penetration have changed with different factors, we also download a series of financial data (stock return, EPS, and volatility) and CEO demographic data (compensation, duality, tenure, age, and gender) from 2012 to 2020

from Bloomberg database. To be consistent with the trade data, both CEO compensation and earnings per share were adjusted to real value using CPI as the deflator. This adjustment ensures that the salary and earnings figures across different years are comparable in real terms, thus allowing for an accurate analysis of trends over time without the distortion caused by inflation.

Table 4 provides a comprehensive overview of the firm's financial and CEO demographic data. The data indicate that 86.3% of the firms in our dataset are large firms listed in the S&P 500 index. On average, firms in our dataset achieve an annual return of 23.4%, with earnings per share (EPS) amounting to $3.704/share. The average compensation package for CEOs stands at $17.5 million. Furthermore, nearly half (47.8%) of these CEOs also serve as Chairman of the Board. The average CEO tenure is close to 7 years, with an average age of 57.29 years. Additionally, the vast majority of CEOs (96.1%) are male.

Table 4: Summary of Firm and CEO Characteristics

Panel 1: Firm Characteristics

Variable	Observation	Mean	Std. dev.	Min	Max
Large	1,553	0.863	0.344	0	1
Return	1,553	0.234	0.588	-3.156	6.84
Earnings per Share	1,553	3.704	6.196	-20.88	127.86
ΔEPS	1,553	0.236	8.495	-191.526	198.5
Volatility 200 days	1,553	30.858	14.082	8.958	111.649
Volatility 360 days	1,553	31.903	14.088	10.854	105.563

Panel 2: CEO Characteristics

Variable	Observation	Mean	Std. dev.	Min	Max
Compensation	1,553	17,500,000	68,400,000	28,213.31	2,660,000,000
Log Compensation	1,553	16.317	0.823	10.248	21.703
Duality	1,553	0.478	0.5	0	1
Tenure	1,553	6.984	6.16	0.083	41
Age	1,553	57.29	6.607	39	84
Gender	1,553	0.039	0.194	0	1

4. Empirical Test

4.1 Baseline Model

Lu et al. (2018) found a significant negative correlation between Chinese imports and the

tone of US local news about China, suggesting that exposure to Chinese imports results in more negative newspaper reports about China in the United States. Building upon their methodology, this study employed more disaggregated data - the change in the firms' attitude on their earnings conference call - to better quantify the impact of import competition on the US economy. Consequently, we anticipate that exposure to Chinese imports would precipitate a deterioration in American firms' attitudes toward China. The baseline model is as follows[9]:

$$\begin{aligned} Positive_{s,f,t} = {} & \beta_0 + \beta_1 IP_{f,t} + \beta_2 Return_{f,t} + \beta_3 \Delta EPS_{s,f,t} + \beta_4 Volatility_{s,f,t} \\ & + \beta_5\, lnCompensation_{f,t} + \beta_6\, Duality_{f,t} + \beta_7\, Tenure_{f,t} + \beta_8\, Age_{f,t} \\ & + \beta_9\, Gender_{f,t} + \varepsilon \end{aligned} \quad (5)$$

where $Positive_{s,f,t}$ is the firm *f*'s positive sentiment about China in speech session *s* (either the CEO Speech session or the Q&A session) in year *t*. $IP_{f,t}$ is the key variable of our interest, which represents the import competition from China faced by firm *f* in year *t*. To control for the baseline speaking tones of American firms, we also incorporate a series of firm characteristics and CEO demographic variables. $Return_{s,f,t}$ is the annual stock return of firm *f* in year *t*. $\Delta EPS_{f,t}$ represent the change in annual earnings-per-share of firm *f* in year *t*. $Volatility_{s,f,t}$ is the average daily stock volatility over the last 360 days in firm *f* in year *t*. $lnCompensation_{f,t}$, $Duality_{f,t}$, $Tenure_{f,t}$, $Age_{f,t}$, and $Gender_{f,t}$ measures the log of real annual compensation, whether having dual designations in the firm, the length of service duration, the age and gender of the CEO of firm *f* in year *t*, respectively. The error term ε captures the unobservable factors that might affect the CEO's sentiment. We also control for the year and sector fixed effect. In alignment with Lu et al. (2018), we expect the β_1 to be significantly negative.

[9] The negative sentiments are also tested against the import penetration. However, compared to the positive sentiment, the firm's negative sentiment ratio does not show any significant results. Hence, this analysis focuses solely on the empirical findings concerning positive sentiments. Details regarding negative sentiment outcomes are available upon request.

Table 5 presents the result of regression (5). To better quantify the different reactions of American firms to Chinese import penetration across different firm sizes, we have stratified our sample into two size groups: large companies (S&P500) and small companies (S&P600). The results show a significant negative relationship between import penetration levels and the positivity of the earnings conference call in both the CEO speech session and the Q&A session. However, an exception to this pattern arises within the context of the S&P 600 during the Q&A session, where the impact of import penetration on CEO sentiment lacks statistical significance. The lack of a significant relationship between import penetration and firm sentiment during the Q&A session among small companies may suggest a nuanced dynamic potentially rooted in the specific characteristics of these small capitalization firms. There might be three explanations. First, unlike CEO open addresses, which are typically treated as an opportunity for executives to articulate a broader strategic vision about the firm, the Q&A session may convey more intermediate or short-term concerns about firms' operations, aspects less likely to be directly influenced by a macroeconomic factor such as import penetration. Second, due to the limited size of their business, small capitalization firms tend to have fewer direct business relationships with China. Consequently, their investors would focus on other more relevant business issues rather than asking about the executives' thoughts on China. Lastly, S&P600 firms are characterized by shorter trading histories, poorer quality financial data, and higher volatility and uncertainty in their businesses, leaving only 214 small capitalization firms in our final sample. Due to the small sample size, the empirical results for small firms might be less reliable compared to large firms.

Table 5: Summary of Positive Sentiments for Baseline

	S&P 500		S&P 600		All	
	(1) CEO speech	(2) Q&A	(3) CEO speech	(4) Q&A	(5) CEO speech	(6) Q&A
IP	-0.7074*	-0.8052*	-1.5361**	4.1052	-0.5727*	-0.6630*
	(0.431)	(0.412)	(0.773)	(2.756)	(0.348)	(0.404)
Firm Character:						
Return	0.0812	0.0146	0.0778	-0.0419	0.1165**	-0.0051
	(0.059)	(0.047)	(0.087)	(0.077)	(0.058)	(0.040)
ΔEPS	0.0028	-0.0004	-0.0048	-0.0077	-0.0019	-0.0011
	(0.004)	(0.004)	(0.011)	(0.018)	(0.003)	(0.004)
Volatility	-0.0175***	-0.0113***	0.0041	0.0014	-0.0059	-0.0103***
	(0.005)	(0.004)	(0.005)	(0.006)	(0.005)	(0.003)
CEO Character:						
lnCompensation	0.0358	-0.0384	0.0701	0.1777	0.0243	0.0461
	(0.065)	(0.053)	(0.118)	(0.145)	(0.063)	(0.047)
Duality	-0.1444	-0.1250	0.1771	0.1694	-0.0496	-0.0801
	(0.105)	(0.081)	(0.211)	(0.218)	(0.112)	(0.075)
Tenure	0.0202**	0.0190***	-0.0255*	0.0017	0.0095	0.0164**
	(0.009)	(0.007)	(0.013)	(0.015)	(0.008)	(0.006)
Age	-0.0108	-0.0244***	-0.0019	-0.0069	-0.0021	-0.0211***
	(0.008)	(0.007)	(0.011)	(0.012)	(0.007)	(0.006)
Gender	0.0140	0.0275	-0.2282	0.7913	0.0368	0.1133
	(0.240)	(0.185)	(0.549)	(0.657)	(0.275)	(0.176)
Fixed effect:						
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Heteroskedasticity:						
Breusch-Pagan	0.0121	0.001	0.0121	0.229	0.0687	0.0494
White	0.268	0.913	0.204	0.002	0.279	0.131
N	1339	1339	214	214	1,553	1,553
R^2	0.402	0.335	0.402	0.443	0.468	0.376

* indicates significance at the 0.05 to 0.1 level
** indicates significance at the 0.01 to 0.05 level
*** indicates significance at less than 0.01 level

In contrast, since large companies have more international business, particularly with Chinese markets, they would be more sensitive to issues about China and would immediately adjust their sentiments accordingly when referring to China. Moreover, CEO attitudes appear to be more sensitive when responding to questions about China during the Q&A session, in contrast to delivering a pre-prepared public address during the CEO speech session. This disparity underscores the distinct roles these two sessions play in corporate communication: CEO speeches, being pre-prepared, showcase controlled, strategic messaging to bolster business objectives, while

the spontaneous nature of Q&A sessions may offer a more authentic insight into CEOs' true perspectives.

Table 5 also shows all baseline regressions have greater than 10% in either one of the heteroskedasticity tests[10], which shows that all independent variables included in the baseline are excluding the heteroskedasticity and their p-value is reliable.

In conclusion, the sentiments of executives in earnings conference calls offer a strategic lens through which the broader impacts of import competition from China on American firms' sentiments can be examined, presenting a more accurate barometer of executive outlook and market perception.

4.2 Heterogeneous Analysis

We now test for the heterogeneous effect of import competition. The heterogeneity is based on different characteristics of firms and executives, including (1) whether the CEO has dual designations, (2) the age of the CEO, (3) market capitalization, and (4) stock investment return. Our first hypothesis is that large companies with closer business relationships with China tend to exhibit greater sensitivity to import competition, as evidenced by the baseline results. Next, we hypothesize that companies with higher annual stock returns attract more attention from investors and analysts, causing these firms to be more sensitive to the current economic issues. Consequently, such firms are expected to demonstrate a more significant response to changes in import competition and shifts in American trading policies. Our third hypothesis is that the firm executives' control over the corporation and their level of maturity may also affect their response to questions regarding market controversial issues, i.e. Chinese import competition. Holding dual designations

[10] Heteroskedasticity is used to test the estimation of the standard errors of the regression coefficients to enhance the accuracy and validity of our analyses for each regression.

or being older in age may empower a CEO to express their views more prominently in public speech.

To account for these heterogeneous effects, we interact these factors with the import penetration index:

$$Positive_{s,f,t} = \beta_0 + \beta_1 IP_{f,t} + \beta_2 IP_{f,t} * Char_{f,t} + \beta_3 Return_{s,f,t} + \beta_4 \Delta EPS_{s,f,t} + \beta_5 Volatility_{s,f,t} + \beta_6 Compensation_{f,t} + \beta_7 Duality_{f,t} + \beta_8 Tenure_{f,t} + \beta_9 Age_{f,t} + \beta_{10} Gender_{s,f,t} + \varepsilon \quad (5)$$

where $Char_{f,t}$ controls for four different firm and CEO characteristics, including the CEO compensation, CEO duality, annual stock return, and firm size. The estimator β_2 measures how the impact of import competition varies with each of these characteristics. The results of how executives' sentiments vary with different CEO-specific (columns 1-4) and firm-specific factors (columns 5-8) are reported in Table 6.

(1) Duality

The significant interaction between CEO duality - where the CEO also serves as the chairman of the board - and positive sentiment is shown as the coefficient of *Duality*IP* in Table 6. CEOs with dual roles exhibit a less positive sentiment index by 1.855 percent in their speeches. This implies that dual-position CEOs, with considerable control over the company, tend to strategically outline the firm's prospects regarding China, reflecting more on the impact of import competition in their public communications.

Table 6: Summary of Sentiments for CEO Characteristics and Firm Characteristics

	CEO speech (1)	Q&A (2)	CEO speech (3)	Q&A (4)	CEO speech (5)	Q&A (6)	CEO speech (7)	Q&A (8)
IP	0.709	-0.146	6.282	-6.638*	-1.618**	4.579	0.551	-0.630**
	(0.658)	(0.659)	(3.830)	(3.943)	(0.808)	(2.784)	(0.404)	(0.312)
Interaction:								
Duality*IP	-1.855**	-0.774						
	(0.860)	(0.860)						
Age*IP			-0.107*	0.099				
			(0.070)	(0.070)				
Large*IP					1.398*	-5.506**		
					(0.853)	(2.800)		
Return*IP							-0.636***	0.191
							(0.199)	(0.148)
Firm Char:								
Return	0.084*	-0.010	0.054	0.004	-0.038	-0.008	0.120*	-0.023
	(0.040)	(0.040)	(0.040)	(0.040)	(0.024)	(0.059)	(0.065)	(0.029)
ΔEPS	0.001	-0.004	0.002	0.000	0.009	-0.002	0.001	-0.004
	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.004)	(0.004)	(0.003)
Volatility	-0.016***	-0.0141***	-0.008**	-0.007**	-0.012***	-0.003	-0.007	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.004)	(0.005)	(0.003)
CEO Char:								
Compensation	0.114**	0.085*	0.042	0.009	-0.023	-0.002	0.048	0.004
	(0.051)	(0.050)	(0.045)	(0.046)	(0.024)	(0.039)	(0.068)	(0.039)
Duality	-0.169**	-0.111	-0.040	-0.084	-0.141*	0.068	-0.053	0.031
	(0.083)	(0.082)	(0.071)	(0.073)	(0.078)	(0.078)	(0.120)	(0.054)
Tenure	0.019***	0.024***	0.006	0.014**	0.015**	0.011	0.002	0.008*
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)	(0.009)	(0.005)
Age	-0.009	-0.021***	0.005	-0.019***	0.000	-0.016***	0.003	-0.010**
	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.008)	(0.004)
Gender	0.018	0.027	-0.103	0.110	0.154	0.073	-0.033	-0.047
	(0.192)	(0.189)	(0.167)	(0.172)	(0.158)	(0.179)	(0.290)	(0.126)
Fixed effect:								
Sector	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1554	1554	1554	1554	1554	1554	1554	1554
R^2	0.397	0.252	0.541	0.404	0.500	0.344	0.313	0.680

* indicates significance at the 0.05 to 0.1 level
** indicates significance at the 0.01 to 0.05 level
*** indicates significance at less than 0.01 level

(2) Age

Results also indicate that older CEOs, with presumably longer tenures, express a slightly less positive tone in their speeches, becoming 0.107 percent less positive for each additional year of age, which is shown by the coefficient of *Age*IP* in Table 6. Older CEOs have greater familiarity with their business and have accumulated more control over the firm, hence feeling more confident in directly addressing controversial issues. This confidence leads to a more spontaneous and significant communication of both opportunities and challenges faced by the company.

The insights of both duality and age suggest a nuanced approach by CEOs in their public communications, influenced by their roles and experience, to navigate the complexities of corporate leadership and strategic direction.

(3) Firm Size

The coefficient of *Large*IP* reveals a significant influence on CEO's sentiment by Chinese import penetration, with notable differences observed between large and small firms. It shows that in CEO speech (column 5), positive sentiment decreases by 1.618 percent for small companies (coefficient of *IP*) and aggregates to a 0.22 percent net decrease for large companies (coefficient of *IP* plus *Large*IP*) given a 1% higher import penetration from China. During Q&A sessions (column 6), large companies experience a 0.927 percent net drop in sentiment (coefficient of *IP* plus *Large*IP*) for one more unit of import penetration. Conversely, small companies tend to show no significant shift in their sentiments towards China when import penetration intensifies. This finding implies that the import competition shock is affecting large companies much more than their small counterparts.

These results illustrate how firm size influences corporate public communication and how CEOs are using slightly different tones in public speech and Q&A sessions. Larger firms, aiming to preserve investor confidence and enhance relationships with the Chinese market, strategically utilize speeches to convey optimism. Hence, their sentiment in CEO speeches tends to reflect less negative impact from import penetration. Meanwhile, large firms exhibit a more sensitive tone in Q&A sessions, reflecting the intricate challenges these companies and CEOs encounter. This provides a comprehensive view of the CEOs regarding their firm's situation and future. Our analysis offers valuable insights into the sophisticated nature of corporate communications, especially for firms with substantial international dealings and strategic interests in markets such as China.

(4) Stock Return

Last, in Table 6, the coefficient of *Return*IP* shows a significant negative correlation between annual stock returns and CEO speech positivity: a 0.0636 percent additional decrease in sentiment for every 10% increase in stock annual returns. This implies that companies with higher annual stock returns receive increased attention from investors and analysts, thereby rendering these firms more responsive to prevailing economic concerns. Such firms are anticipated to exhibit a more pronounced reaction to alterations in import competition and shifts in American trading policies.

To sum up, as import competition intensifies, firms' attitudes towards China worsens correspondingly. This inverse relationship is particularly evident in companies with high stock returns, companies led by older managers, or those where managers hold dual designations. In addition, our analysis suggests a deliberate strategy by CEOs of larger firms to convey more stable tones in public speeches, potentially enhancing relationships with Chinese customers, and

reassuring investors regarding future investments in China. Meanwhile, the CEOs may express more of the shift in their sentiments during the Q&A session.

4.3 Event Study: the US-China Trade War

Next, we examine the impact of the US-China Trade War on the response of American firms regarding Chinese import competition. Since 2018, the Trump Administration has initiated a trade war against imports from China by imposing punitive tariffs on various Chinese goods. Such a significant shift in US trade policy served as an exogenous variable that has significantly influenced the attitude of American businesses towards China, thereby potentially exerting far-reaching effects on the future business engagements between the two nations, making it a topic worthy of exploration. Building upon the study by Jiang et al. (2021), which investigated the perception of President Trump among various groups of Twitter users during the Trade War period from 2018 to 2020, we adopt a similar methodology to study the effect of the trade war on American firms' attitudes. Specifically, we conduct an event study, with the beginning of 2018 marking the onset of the trade war, and analyze the changes in attitudes of American firms before and after this event.

In Table 8, the coefficient of *IP*Trade_war* illustrates a more pronounced negative correlation between import competition and CEO sentiment following the onset of the trade war. Throughout this period, CEOs proactively responded to the shifts in US trading policies by decreasing the positivity in their speeches by 0.737 percent and 3.954 percent during public speeches and Q&A sessions, respectively, when confronted with competition from China.

We also found that the impact of the trade war on CEO sentiments is more pronounced during Q&A sessions when CEOs are responding to questions from analysts than when they are

delivering a prepared public speech that has been agreed upon by the entire investor relations team and all senior executives.

Table 8: Summary of Positive Sentiments for Trade War

	CEO speech	Q&A
Interaction:		
IP*Trade_war	-0.737*	-3.954*
	(0.447)	(2.312)
IP	1.383	3.457
	(0.890)	(2.278)
Trade war	-0.196	0.384
	(0.214)	(0.951)
Firm Characteristics:		
Return	0.075	0.037
	(0.047)	(0.063)
ΔEPS	0.003	-0.002
	(0.004)	(0.004)
Volatility	-0.016***	0.008*
	(0.004)	(0.005)
CEO Characteristics:		
Log.Compensation	0.091	0.098
	(0.058)	(0.069)
Duality	-0.128	0.151
	(0.091)	(0.121)
Tenure	0.012	0.003
	(0.008)	(0.009)
Age	-0.005	-0.006
	(0.007)	(0.008)
Gender	0.050	0.550*
	(0.212)	(0.301)
Fixed effect:		
Sector	Yes	Yes
Year	Yes	Yes
N	1554	1554
R^2	0.396	0.233

* indicates significance at the 0.05 to 0.1 level
** indicates significance at the 0.01 to 0.05 level
*** indicates significance at less than 0.01 level

In summary, the Trade War is leading to more conservative sentiments among American firms regarding issues concerning the Chinese market during their CEO keynotes, revealing that American publicly listed companies operate under the regulation of the US government. Hence, businessmen exhibited worsened attitudes to show a political stance in alignment with the government policy. Moreover, such deterioration in sentiment was more clearly indicated when

the executive answering questions raised by institutional analysts during the Q&A session, regarding how these firms evaluate the Chinese market and their future business prospects in China amid accelerated tensions in US-China political relations.

5. Conclusion

We study the change in firm-level sentiments corresponding to the import competition from China. Using the transcripts of CEO speeches and Q&A sessions on corporate earnings conference calls for both the S&P500 and S&P600 corporations between 2012 and 2020, we applied advanced computational techniques to reveal a nuanced change in executive communications in the face of international import competition and government trade policies. This study underscores the sensitivity of CEO public communications to the dynamics of foreign trade, highlighting how external economic policies and trade relationships, particularly with China, shape corporate attitudes in public discourse. By applying the textual analysis methodologies, our research has shed light on the intricate relationship between executive communication, international trade dynamics, and government policies, deepening our understanding of how global economic factors shape corporate leadership and strategy, and providing valuable insight for policymakers, investors, and analysts.

Our research reveals four main conclusions. First, as import competition intensifies, firms' attitudes towards China worsen correspondingly, indicating the pressures of addressing investor concerns on topics such as business with China. Moreover, CEO attitudes appear to be more sensitive when responding to questions about China during the Q&A session, in contrast to delivering a pre-prepared public address in the CEO speech session. Hence, we believe that the spontaneous nature of Q&A sessions may offer a more authentic insight into CEOs' true perspectives.

Second, we test for the heterogeneous effect of import competition on US firm's sentiment. Evidence shows that the inverse relationship between import competition and firm sentiment is particularly evident in companies with high stock returns, companies led by older managers, or those where managers hold dual designations.

Third, large companies have shown larger shifts in attitude toward import competition from China, especially those companies that have closer business relationships with China. In addition, larger firms tend to convey a less volatile sentiment in their pre-prepared public communications, enhancing relationships with Chinese customers and reassuring investors regarding future investments in China. However, when facing questions regarding their business with China in Q&A sessions, CEOs tend to express more of a shift in their sentiments.

Last, an event study is further conducted to measure how the American firms' sentiments vary differently to the Chinese import competition before and after the US-China trade war starting in 2018. We found that the punitive trade tariffs and restrictive policies inversely affected the sentiment of CEO and firms, which reveals the significant effects of government trade actions on their corporate business. These findings not only validate the significant correlation between government policy and corporation sentiment, but also offer practical insights for policymakers, investors, and corporate leaders in navigating the intricate dynamics of international trade and communication.

This research opens several avenues for future investigation, including the potential impact of CEO sentiment on investor behavior and market outcomes, and the role of specific linguistic cues in shaping investor perceptions. Firstly, our focus on trade dynamics between China and the United States could be broadened to include other major trading partners or explore relationships between other countries. Secondly, leveraging the LIWC tool, future studies could extend

sentiment analysis to other financial texts to discern varying impacts across firms. Thirdly, our research indicates a mediation effect where import penetration influences CEO sentiments in public communications. This dynamic could further treat the CEO sentiment as a mediation to examine how their sentiment affects the future financial outcomes of these firms. Lastly, while we discussed the general impact of the trade war on CEO sentiment, further research could investigate specific punitive tariffs to provide deeper insights into how they impact different industries and their severity levels. By delving deeper into these areas, subsequent studies can build on our findings to offer even more nuanced insights into the strategic communication practices of corporate leaders in an increasingly globalized and interconnected economic landscape.

In conclusion, our study contributes a critical lens through which to view the intricate relationship between executive communication, trade policies, and global market dynamics. By offering innovative perspectives on CEO sentiment and its implications for international business, this research enriches the dialogue on corporate governance and leadership in the face of global economic challenges.

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