

The effect of economic ties on digital diplomacy: A sentiment analysis of the Twitter accounts of Chinese diplomatic missions*

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Abstract

I examine how economic ties between host and guest countries affect the emotional valence in the social media content published by digital diplomats (DD). Strong economic ties will lead DD to adopt a positive tone because strong economic ties raise the potential costs of verbal aggressiveness online. A positive emotional valence on social media also serves to cultivate good public perceptions of the guest and its economic activities. To evaluate these claims, I analyze 53,601 original tweets published by 88 Chinese diplomatic Twitter accounts from 2014 to 2020. I find economic ties have a strong positive effect on the tone adopted by DD. As the host's trade dependence with China increases, Chinese diplomatic missions are more likely to adopt a positive tone on Twitter, especially when talking about politics and business. This research contributes to the study of how countries use social media to conduct diplomacy.

Keywords: Public diplomacy, Social media, China, Sentiment analysis, Chinese foreign policy, Political communication

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Introduction

In September 2020, two Chinese embassies tweeted about Xinjiang. The Chinese Embassy in the U.S. tweeted a picture showing the population of ethnic minorities, Hans, and Uyghurs in the region. Specifically, it showed how ethnic minorities have increased by 22 percent, while Uyghurs have increased by 25 percent in Xinjiang. The picture was accompanied by the phrase: “Who is making the fake news of ‘#Xinjiang genocide’?”¹ In contrast, the Chinese Embassy in Cuba tweeted a video resembling that of a tourism campaign, showing two friends walking and having fun near a lake surrounded by Xinjiang’s beautiful mountains. The video was accompanied by the phrase: “#GlamorChina This lake is located in Nilka County, #Xinjiang Uyghur Autonomous Region. Formed from melted water from the snowy mountain, the lake is enchanting with snowy peaks and trees surrounding it”.² The Chinese Embassy in Cuba tweeted about Xinjiang’s natural scenery, while the Chinese Embassy in the U.S. wrote a negative tweet about ethnic minorities. Why did one embassy adopt a positive emotional valence while the other adopted a negative emotional valence? We do not have a good understanding of how countries use social media to conduct public diplomacy.

In recent years, scholars have begun to explore the strategies practiced in social networking sites (SNS) by government institutions, such as embassies and foreign ministries (MFA). This research falls within the field of digital diplomacy.³ Most research on digital diplomacy assumes or finds that practitioners often adopt a positive emotional valence (i.e., tone or sentiment) on SNS (Uysal, Schroeder and Taylor, 2012; Manor and Segev, 2015; Huang and Wang, 2019). However, we sometimes see practitioners adopting a negative tone on social media (e.g., China’s “Wolf-Warrior” diplomats). This research seeks to bridge this gap in the literature by examining the factors that account for the variation of emotional valence on SNS. In addition, previous studies are mostly characterized by small samples, short time periods, and a lack of language diversity. This study fills a gap in the literature by taking an empirical approach to studying over eighty Chinese diplomatic accounts in multiple countries over a period of six years.

This research takes a first step to answer why some digital diplomacy practitioners adopt a positive emotional valence on SNS while others prefer to adopt a negative emotional valence. It focuses on the relationship between digital diplomacy’s emotional valence and economic ties. Specifically, how economic ties between host and guest

¹Chinese Embassy in US (@ChineseEmbinUS). 2020. Twitter. September 4. <https://twitter.com/ChineseEmbinUS/status/1301888445070086146>.

²Embajada de la República Popular China en Cuba (@EmbChinaCuba). 2020. Twitter. September 19. <https://twitter.com/EmbChinaCuba/status/1307333611327295489>.

³In recent years, we have seen an abundance of terms used to describe the migration of MFA and embassies to the online world. Some of these terms are “cyber diplomacy”, “digiplomacy”, “virtual diplomacy” (Costigan and Perry, 2013), and more recently, “digital diplomacy” (Kampf, Manor and Segev, 2015; Bjola and Jiang, 2015; Manor, 2019). I use the latter in this research.

countries affect the emotional valence of social media content published by diplomats. It is important to study digital diplomacy's emotional valence because it can be used as a low-level information warfare tool to influence foreigners' public opinion and advance foreign policy goals, including economic interests. Although many factors might influence digital diplomacy's emotional valence, the relationship between economic ties and digital diplomacy is important in its own right, and it lends itself to further study how countries use SNS to conduct public diplomacy.

The theory focuses on two theoretical propositions to explain how economic ties between host and guest countries affect the emotional valence in the social media content published by diplomats. First, economic ties inhibit a negative emotional valence on SNS because there exist additional opportunity costs associated with it. This argument is built on the commercial peace literature (Polachek, 1980; Hegre, Oneal and Russett, 2010; Chen, 2021). Strong economic ties between two trading partners can raise the potential costs of verbal aggressiveness online. By engaging in hostile behavior on SNS, diplomats risk jeopardizing the guest's established business ties in the host, as in the case of the Twitter brawls between the Bolsonaro family and China.

Second, a positive emotional valence in digital diplomacy can be used as a legitimacy-building strategy. The business legitimacy literature suggests firms doing business abroad face difficulties in gaining social acceptance or legitimacy (Kostova and Zaheer, 1999; Yang, Su and Fam, 2012). Practitioners of digital diplomacy can use positive messages as a legitimacy-building strategy by cultivating good public perceptions about their country and its economic activities. Thus, the hypothesis is: Digital diplomacy practitioners in host countries with stronger economic ties with the guest country will adopt a stronger positive emotional valence than digital diplomacy practitioners in countries with weaker economic ties with the guest country. In other words, economic ties should have a positive effect on the tone displayed by digital diplomacy practitioners.

To evaluate the hypothesis, I construct an original dataset of diplomatic tweets. I collect 53,601 tweets published by 88 Chinese diplomatic Twitter accounts from 2014 to 2020. Using these tweets, I conduct a dictionary-based sentiment analysis and estimate a series of models to illustrate the relationship between economic ties and digital diplomacy's emotional valence. The results suggest economic ties between the host and guest countries have a positive effect on the tone displayed by digital diplomacy practitioners. As the host's trade dependence with China increases, there is a higher chance of Chinese diplomats adopting a positive tone on Twitter. This means Chinese embassies and consulates are more likely to adopt a positive tone in hosts where trade with Beijing is vital, such as Angola, Chile, or South Korea.

I also conduct a systematic analysis of the topical content of Chinese diplomatic tweets to find whether the relationship between emotional valence and economic ties is conditional on the topic. I employ a supervised machine learning approach to apply a four-category classification scheme over the corpus of Chinese diplomatic tweets. The findings suggest that the positive effect of economic ties on digital diplomacy's emotional valence is mostly driven by tweets about politics (e.g., bilateral relations or military cooperation) and the economy, such as trade or finance.

This study makes several important contributions to the literature. First, this research takes a first step to explain why some digital diplomacy practitioners adopt a positive tone on SNS while others prefer to adopt a negative tone. Second, few studies have explored digital diplomacy over a long time period and across multiple host countries. This study narrows the gap in the literature by analyzing more than eighty Twitter accounts across multiple hosts over six years. Third, it joins a growing literature that examines key dimensions of China's economic statecraft and diplomacy (e.g., Martin, 2021; Mattingly and Sundquist, 2022; Brazys, Dukalskis and Müller, 2022).

Digital Diplomacy and Emotional Valence: A brief overview

Digital diplomacy, broadly defined as the use of SNS for diplomatic purposes (Bjola and Holmes, 2015, 4), has been extensively studied. Most research on digital diplomacy assumes or finds that digital diplomacy practitioners often adopt a positive emotional valence (i.e., tone or sentiment) on SNS. For example, Manor and Segev (2015) analyze the State Department's English Twitter and Facebook messages over a month and find that they portrayed Washington as an economically responsible superpower with moral values and a positive impact on other countries. Similarly, Uysal, Schroeder and Taylor (2012) analyze tweets from three top Turkish governmental officials' personal and official accounts. Their study explores how Turkey is shaping a positive national image and reveals that Ankara is using Twitter for image cultivation and traditional one-way communication (i.e., broadcasting). Likewise, Natarajan (2014) suggests that India leverages social media to enhance its global image, whereas Huang and Wang (2019) argue China uses Twitter to promote a positive national image and pursue the external propaganda goals of the CCP.

Despite the finding that embassies and consulates should generally convey a positive emotional valence on SNS, practitioners sometimes adopt a negative tone on social media. A recent example is "Wolf-Warrior" diplomacy, an aggressive style adopted by Chinese diplomats, particularly on social media (Martin, 2021). Scholars have just started to explore changes in the variations of this negative diplomatic approach used by Beijing (Brazys, Dukalskis and Müller,

2022). Other countries also engage in this aggressive-style diplomacy on SNS. For instance, when the U.K. threatened Russia with sanctions following the alleged poisoning of Sergei Skripal, the Russian Embassy in the U.K. responded by tweeting: “Any threat to take ‘punitive’ measures against Russia will meet with a response. The British side should be aware of that.”⁴ The use of threats and ultimatums represents a form of verbal aggression in digital diplomacy, as discussed in the theory section. The provided examples demonstrate the range of emotional valence that diplomatic online messages can have. This research seeks to bridge a gap in the literature by examining the factors that account for the variation of emotional valence on SNS.

It is important to highlight other characteristics of the studies identified above. First, their results are only based on a few social media accounts or countries. Bjola and Jiang (2015) use three accounts, Uysal, Schroeder and Taylor (2012) use six accounts, and Huang and Wang (2019) use fourteen accounts. Such small sample sizes might limit the generalizability of the findings. Second, many previous studies have had a limited duration, such as four weeks (Manor and Segev, 2015), six weeks (Kampf, Manor and Segev, 2015), or seven weeks (Bjola and Jiang, 2015). A longer period is needed to fully understand the current practice and trends of digital diplomacy. This study aims to bridge this gap by analyzing over eighty Twitter accounts from multiple countries over a period of six years. Finally, the digital diplomacy literature has been limited by language diversity, as previous studies have focused on practitioners publishing content in the same language, such as English (e.g., Uysal, Schroeder and Taylor, 2012; Kampf, Manor and Segev, 2015; Brazys, Dukalskis and Müller, 2022). In contrast, this study analyzes text in multiple languages.

Digital diplomacy differs in various ways from traditional public diplomacy. This has three important implications for international relations. First, digital diplomacy gives the public a more prominent role in international affairs. It reshapes foreign policy discussions from occurring only between elites, to now occurring between government officials and foreign publics (Pamment, 2012). Second, digital diplomacy allows countries to circumvent host countries’ domestic media. In the past, diplomats could only influence the framing of their countries by hiring domestic public relation firms and lobbyists, and building good relationships with local journalists, editors, and media outlets. Diplomacy disrupts this relationship between diplomats and domestic media by allowing diplomats to directly target and interact with foreign populations. Finally, digital diplomacy encourages two-way communication and helps forge relationships between diplomats and digital communities. Traditional public diplomacy consisted of one-way flows of information that saw

⁴Russian Embassy, UK (@RussianEmbassy). 2018. Twitter. March 13. <https://twitter.com/RussianEmbassy/status/973611069687156736>.

limited interaction between messengers and recipients (Pamment, 2012). However, digital diplomacy encourages two-way flows of information (Manor, 2019). The elites and the public of the host country can use SNS to respond to or contest digital diplomacy actors or messages.

This can lead to positive two-way communication. For example, Chinese diplomatic missions often tweet answers to questions from ordinary users asking about visa policies. Conversely, this can also lead to negative two-way communication. A good example of this is the bitter confrontation in July 2019 between Zhao Lijian, a Chinese diplomat, and Susan Rice, former U.S. National Security Advisor. To defend China's policy of establishing "re-education camps" in Xinjiang, Zhao tweeted allegations about racial segregation in Washington DC, claiming that new black residents drove out white residents, leading to plummeting house prices.⁵ Using Twitter, Rice responded by calling him a "racist disgrace" and calling on Cui Tiankai, China's Ambassador to the U.S., to "send him home". Zhao fired back by describing Rice as "shockingly ignorant", "disgraceful", and "disgusting".⁶ Although conversations online might end up in public feuds, the important thing is digital diplomacy encourages two-way communication and forges (positive or negative) relationships between diplomats and digital communities.

These three implications inspire this paper. This research focuses on the relationship between digital diplomacy's emotional valence and economic ties. Emotional valence describes the extent to which an emotion is positive or negative. Studying emotional valence in the context of digital diplomacy is essential because social media platforms can be employed as a low-level information warfare tool to sway foreign public opinion and advance foreign policy objectives. This is called the "dark side" of digital diplomacy (Bjola and Pamment, 2018), and it has expanded in recent years. In January 2021, for example, the Chinese Embassy in the U.S. used Twitter as a low-level information warfare tool to spread misinformation regarding Beijing's treatment of Uyghurs.⁷ This is just one example of how digital diplomacy can be used to manipulate information. This study considers positive or negative messages on SNS as low-level information warfare that can be used to advance foreign policy goals, including economic interests.

⁵Churchill, Owen. 2019. "Chinese diplomat Zhao Lijian, known for his Twitter outbursts, is given senior foreign ministry post." *South China Morning Post*. August 24. <https://www.scmp.com/news/china/diplomacy/article/3024180/chinese-diplomat-zhao-lijian-known-his-twitter-outbursts-given>.

⁶Feng, Zhaoyin. 2019. "China and Twitter: The year China got louder on social media." *BBC*. December 29. <https://www.bbc.com/news/world-asia-china-50832915>.

⁷Goh, Brenda. 2021. "Twitter locks account of China's U.S. embassy over its defense of Xinjiang policy." *Reuters*. January 20. <https://www.reuters.com/article/us-china-twitter/twitter-locks-account-of-chinas-u-s-embassy-over-its-defense-of-xinjiang-policy-idUSKBN29Q03O>.

Theory: Digital Diplomacy and Economic Ties

The positive or negative messages on SNS can be used as a low-level information warfare tool to advance foreign policy goals. Although many factors might condition the emotional valence adopted by diplomats, this paper focuses on economic ties. Specifically, to what extent the positive or negative emotional valence in the content published by practitioners is driven by economic ties between the guest and host countries. I propose two ways in which economic ties have a positive impact on digital diplomacy: the opportunity cost and business legitimacy arguments.

First, economic ties could inhibit a negative emotional valence on SNS because there exist additional opportunity costs associated with it. This argument is largely inspired on the “opportunity cost” argument in the trade-conflict or commercial peace literature. Scholars have long debated whether trade facilitates peace. In a seminal study, Polachek (1980) argues that the mutual dependence established between two trading partners raises the potential costs of interstate conflict. Conflict diminishes bilateral trade that results in lost gains from trade for both countries. The opportunity costs arise because nations tend to forgo trade with combatants. When interstate conflict happens, combatants often implement trade embargoes, raise trade tariffs, or set unfavorable quotas against their adversaries. To prevent these potential gains from trade losses, trading nations become more cooperative, thereby decreasing the hostility between them. This explanation is known as the opportunity cost argument. Later research also supports the opportunity cost argument (e.g., Hegre, Oneal and Russett, 2010; Chen, 2021).

Although scholars focus on conflict as disputes and war, the opportunity cost argument should also apply to online verbal conflict. If strong bilateral trade leads to lower levels of conflict, online messages should indirectly reflect this same pattern by displaying low levels of verbal aggressiveness. Verbal aggression has long been defined by academics as “message behavior which attacks a person’s self-concept in order to deliver psychological pain” (Infante, 1995). Verbal aggression is usually associated with character attacks, competence attacks, background attacks, ridicule, swearing, name-calling, the use of threats and ultimatums, etc. (Infante, 1987).

Disputes between nations can lead to verbal aggression in digital diplomacy. For example, Chinese digital diplomacy practitioners responded with character attacks to two American government officials as a result of intensified rivalry between the U.S. and China. On August 08 2020, the Chinese Embassy in the U.S. tweeted a video where Dr. Shi Zhengli, a virologist from the Wuhan Institute of Virology, responded to American accusations regarding China’s

negligence in dealing with the COVID-19 by calling both U.S. President Trump and Secretary Pompeo “liars”.⁸ These character attacks are examples of verbal aggression provoked by disputes between countries. If strong economic ties between two states provide strong material incentives for them to prevent conflict, messages published by diplomats should reflect this same pattern by making verbal aggression less likely, thereby increasing the likelihood of a positive emotional valence on SNS.

Besides an indirect impact, the opportunity cost argument could also have a direct impact on digital diplomacy. Strong economic ties between two trading partners raises the potential costs of engaging in verbal aggressiveness online. Verbal aggressiveness could lead to lost gains from trade for both countries. By adopting a hostile behavior on SNS, for instance, digital diplomacy practitioners might risk jeopardizing the guest country’s established business ties in the host. A negative tone might provoke the host’s government to pursue protectionist policies (e.g., tariffs) against the guest country. It could also offend the host’s citizens, and as such, they might call for boycotts of products coming from the guest country. Considering these risks, digital diplomacy practitioners will inhibit themselves from publishing negative messages to not disrupt trade between the host and guest countries.

This argument raises the question of whether digital diplomacy is only “cheap talk”. However, scholars have argued that digital diplomacy can have material consequences by enhancing international collaboration, positively managing international crisis and stimulating trade relations (Bjola and Pamment, 2018, 2). Moreover, recent developments have demonstrated digital diplomacy can have a deep impact on international relations, including the trade and financial realms.

A good example of how digital diplomacy can influence “real-world” economic affairs is the recent Twitter brawls between the Bolsonaro family and China. Brazilian President Jair Bolsonaro’s son and Federal Deputy for São Paulo, Eduardo Bolsonaro, often goes on anti-China rants that echo Trump’s statements.⁹ He often calls COVID-19 “the Chinese virus” and blames Beijing for the pandemic. Eduardo Bolsonaro’s tweets blaming Beijing for the virus provoked a strong reaction by Brazil’s top trading partner, China. In March 2020, the Chinese Embassy in Brasilia used Twitter to call him “irresponsible”, term his claims “absurd and prejudiced”, and call the entire Bolsonaro family “poison” for Brazil.¹⁰ The tweets not only created a diplomatic crisis between the two countries, but also had economic

⁸Chinese Embassy in US (@ChineseEmbinUS). 2020. Twitter. August 10. <https://twitter.com/ChineseEmbinUS/status/1292932157791506432>.

⁹Santoro, Mauricio. 2020. “The troubled relationship between the Bolsonaro family and China.” *The Brazilian Report*. March 23. <https://brazilian.report/opinion/2020/03/23/troubled-relationship-jair-bolsonaro-family-china/>.

¹⁰Adghirni, Samy. 2020. “China Outraged as Bolsonaro’s Son Blames Virus on Beijing.” *Bloomberg*. March 19. <https://www.bloomberg.com/news/articles/2020-03-19/china-outraged-as-brazil-president-s-son-blames-virus-on-beijing>.

consequences for Chinese trade in Brazil. Bolsonaro's supporters responded to the tweets by calling for Brazilians to boycott Chinese products. The boycott calls were amplified by popular social media accounts, such as @PoltzOficial with more than 140,000 followers. The anti-China campaign was even joined by high-level Brazilian government officials, such as Minister of Education Abraham Weintraub.¹¹ A situation that occurred on Twitter escalated into the "real world". Considering negative consequences for trade like boycotts, digital diplomacy practitioners would avoid publishing negative messages on SNS.

While the first argument focuses on the economic opportunity costs of verbal aggressiveness online, a positive emotional valence in digital diplomacy also serves to cultivate good public perceptions of the guest country and its economic activities. This in turn will increase the legitimacy of the guest doing business in the host. The business legitimacy literature suggests that firms doing business abroad face difficulties in gaining social acceptance or legitimacy (Yang, Su and Fam, 2012). Business legitimacy is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, 574). Multinational companies face legitimacy issues because their potential host partners do not recognize them as socially fit partners since locals do not know or trust them (Kostova and Zaheer, 1999).

Digital diplomacy practitioners can strategically use a positive emotional valence as a legitimacy-building strategy by cultivating good public perceptions about their country and its economic activities. Nations can use digital diplomacy to proactively manage their image. For instance, countries can improve their image abroad through SNS by promoting positive national images (Manor and Segev, 2015). Moreover, they can use SNS to help their nation's companies overcome legitimacy issues. On March 25 2020, for example, the Chinese Embassy in Pakistan tweeted that "Chinese companies are together with Pakistan in fighting coronavirus: @HuaweiPK donated a video conference system to Ministry of Health in the fight against COVID-19 #ChinaPakSolidarity".¹² This overseas mission is using digital diplomacy to promote a positive image of China and a Chinese technology company in a country that is economically dependent on Beijing. Positive messages like this one can be used as an effective legitimacy-building strategy.

This section discusses two reasons why strong economic ties between the host and guest encourage digital diplomacy practitioners, such as diplomatic missions, to adopt a positive tone on SNS. First, economic ties inhibit a negative emotional valence on SNS because there are additional opportunity costs associated with it. Second, a positive emotional

¹¹ Agência Senado. "Senators express concern over attacks on China on social media". *Senate News Agency*. <https://www12.senado.leg.br/noticias/materias/2020/04/06/senadores-demonstram-preocupacao-com-ataques-a-china-nas-redes-sociais>.

¹² Chinese Emb Pakistan (@CathayPak). 2020. Twitter. March 25. <https://twitter.com/CathayPak/status/1242696068216819712>.

valence in digital diplomacy can serve to cultivate good public perceptions of the guest country and its economic activities. Therefore, the hypothesis is that digital diplomacy practitioners in hosts with stronger economic ties with the guest country will adopt a stronger positive emotional valence than digital diplomacy practitioners in countries with weaker economic ties with the guest country. In other words, economic ties should have a positive effect on the tone displayed by digital diplomacy practitioners.

Hypothesis: Economic ties will have a positive effect on the tone displayed by digital diplomacy practitioners.

Chinese Digital Diplomacy on Twitter as a Case Study

Over the past twenty years, Beijing has courted foreign audiences through cultural and language programs (e.g., Confucius Institutes), tourism campaigns, journalist hosting programs, sport exchange programs, and more recently, digital diplomacy. The Chinese MFA has active YouTube, Instagram, Facebook, and Twitter accounts. It is on Twitter where Chinese diplomats are more active.¹³ Although these platforms are blocked in the Mainland, Beijing is seeking to engage directly with a worldwide audience. Moreover, it seems overseas envoys are being encouraged to use Twitter. On October 2019, Beijing created an official @MFA_China account for the Ministry of Foreign Affairs. After that, the number of Chinese overseas missions on Twitter increased sixfold.

[Figure 1]

Figure 1 summarizes this increasing trend. The x-axis represents the date, the left y-axis shows the number of Chinese diplomatic missions opening a Twitter account per month, and the right y-axis represents the number of missions with a Twitter presence. The first Chinese missions to establish a Twitter presence were the Embassies in Japan and Canada in 2014. Only twelve Chinese embassies and consulates abroad had official Twitter accounts by 2018. From 2018 to 2019, however, the number of Chinese diplomatic missions on Twitter tripled. In 2019, forty missions opened a Twitter account, including the Chinese Embassy in the U.S. This year is known as “the year China got louder in social media” not only because overseas envoys are being encouraged to use Twitter, but also because Beijing is seeking to engage directly with a worldwide audience and influence the global narrative of China.¹⁴ The use of Twitter

¹³As of December 14, 2020, the Chinese MFA Twitter account has 231.5K followers, its YouTube channel has 3.11K subscribers, its Instagram has 1,259 followers, and its Facebook has 14,828 followers and 10,115 likes.

¹⁴Feng, Zhaoyin. 2019. “China and Twitter: The year China got louder on social media.” *BBC*. December 29. <https://www.bbc.com/news/world-asia-china-50832915>.

by Chinese overseas missions has increased steadily, and appears to be continuing to climb, as shown in Figure 1. In 2020, thirty-eight missions opened a Twitter account. There are currently ninety Chinese diplomatic missions with a Twitter presence. In light of this surge in Chinese diplomats using Twitter, it is important to understand how China uses SNS to operationalize economic and political interests.

The case of China is important for analyzing the relationship between economic ties and digital diplomacy because China has one of the largest economies and strongest cyber capabilities in the world (Voo et al., 2020). With 272 operating diplomatic missions, China has the largest diplomatic network in the world. It would be naive to think that what Chinese diplomats write on Twitter is completely uncorrelated to each other. China's authoritarian nature and centralized diplomatic communication network result in strong control of its public diplomacy by the CCP (d'Hooghe, 2021). Self-censorship or censorship by the Chinese MFA or the CCP could skew tweets toward a particular emotional valence. These missions over time may not represent independent tests of the hypothesis since they are correlated. However, dependence among these overseas missions does not disqualify them as units unless the dependence is perfect—that is, unless we can perfectly predict the new data from the existing data (King, Keohane and Verba, 1994, 222). It would be erroneous to believe their correlation is perfect since Chinese diplomats are not monolithic. While the party tightly controls its strategic narratives and those who are telling them, Chinese diplomats vary in their use of social media. The Chinese foreign policy establishment does not have a consensus on whether confrontational diplomacy and verbal aggressiveness online are desirable.¹⁵

In the aftermath of the pandemic, a public feud between two Chinese diplomats exemplifies such differences. In March 2020, Zhao Lijian, a Chinese diplomat, utilized Twitter to attack the U.S. Centers for Disease Control and accused the U.S. military of bringing the epidemic to Wuhan. In contrast, Cui Tiankai, China's former ambassador to Washington, tried to reduce the aggressive diplomacy and dismissed Zhao's claims as "crazy." Cui stated, "Such speculation will help nobody. It's very harmful."¹⁶ This public spat between two top Chinese diplomats shows that even in a strongly controlled environment digital diplomacy has variation. These are not average social media users, but political elites from an authoritarian state, and their online political behavior is worth exploring.

I consider the tweets from these accounts as tailored foreign-facing messages. In the literature, there is an ongoing

¹⁵Zhu, Zhiquan. 2020. "Interpreting China's Wolf-Warrior Diplomacy." *The Diplomat*. May 15. <https://thediplomat.com/2020/05/interpreting-chinas-wolf-warrior-diplomacy/>.

¹⁶Bloomberg News 2020. "China Outraged as Bolsonaro's Son Blames Virus on Beijing." *Bloomberg*. March 23. <https://www.bloomberg.com/news/articles/2020-03-23/china-s-top-envoy-to-u-s-breaks-with-foreign-ministry-on-virus?leadSource=uverify%20wall>.

debate about whether social media is used in diplomacy to target domestic or foreign audiences, as the same social media profiles can attract both audiences and facilitate interactions with both domestic and foreign constituencies (Bjola and Holmes, 2015; Manor, 2019). While this research does not aim to settle the debate, it defines online public diplomacy as targeting, at least in part, foreign publics.

One reason to believe this is that overseas missions tailor their online messages to the language, values, norms, and even slang of foreign audiences (Manor, 2019, 184). For instance, Chinese embassies and consulates mostly tweet using the native language of their host country. Based on this study's data, 96% of the tweets published by the Chinese Embassy in Brazil (@EmbaixadaChina) are in Portuguese. If the Chinese diplomatic network were targeting Chinese audiences, we would expect to see a higher percentage of tweets in Chinese. Another reason to consider Chinese diplomatic tweets as foreign-facing messages is that Twitter is banned in Mainland China. While citizens can use VPNs to access Twitter, the number of active users on the mainland is very low.¹⁷

Data Collection

The list of active Chinese diplomatic missions was retrieved from the Chinese MFA website.¹⁸ For each of the 272 Chinese diplomatic missions, I performed a manual search for an associated Twitter account. The accounts were included in the sample if they had a blue verified badge next to their name or were followed by official government accounts, such as the Chinese MFA, embassies, ambassadors, etc. I was able to find accounts for ninety embassies and consulates. No account failed the previous requirements, but the Chinese Embassy in Suriname (@CHNEmbSuriname) and the Chinese Embassy in Oman (@ChinaEmbOman) had no tweets. These two accounts were removed from the sample.¹⁹

I used Twitter's API via rtweet, in the R programming language, to collect the 3,200 most recent tweets for each account (Kearney, 2020). This approach has two potential limitations. The first limitation is Twitter API limits returns to the last 3,200 tweets posted or retweeted by each user.²⁰ Only 5 of the 88 Twitter accounts in the sample exceeded

¹⁷Mozur, Paul. 2019. "Twitter Users in China Face Detention and Threats in New Beijing Crackdown." *New York Times*. January 19. <https://www.nytimes.com/2019/01/10/business/china-twitter-censorship-online.html>.

¹⁸Ministry of Foreign Affairs of the People's Republic of China. 2020. *Mission Overseas*. https://www.fmprc.gov.cn/mfa_eng/wjb_663304/zwjg_665342/.

¹⁹Selection bias is unlikely to have occurred in this study because all countries with a Chinese diplomatic mission on Twitter are included, while those where Chinese diplomatic missions do not have a presence on Twitter or without a Chinese overseas mission are outside the analysis scope.

²⁰The initial Twitter API limited users to obtaining only 3,200 tweets per account. In November 2021, Twitter released API v2, which enables users to retrieve all tweets from an account.

the 3,200 tweets threshold. The second limitation is data requests via Twitter's API do not include deleted or private Tweets. Extremely negative tweets might be deleted, and therefore, missing from the evaluated sample. It is worth mentioning that Chinese digital diplomacy practitioners tend to not delete tweets, even after they create a negative backlash. In November 2020, for instance, a Chinese diplomat used digital diplomacy as a low-level information warfare tool by tweeting an altered image of an Australian soldier holding a knife to the throat of a young Afghan boy. Canberra demanded an apology and the tweet be deleted, but the Chinese diplomat refused, even pinning the tweet at the top of his profile.²¹

[Figure 2]

I extracted tweets between December 26 and 27, 2020. The search yielded a total of 53,601 tweets (excluding retweets) from 88 different Chinese diplomatic Twitter accounts. Figure 2 shows the geographical distribution of overseas missions using Twitter. Most Chinese diplomatic missions active on Twitter are located in major or regional powers, such as the U.S., France, Japan, Brazil, and Turkey. Interestingly, there are active accounts in places where the number of Twitter users is rather small, such as Cuba or Sri Lanka.

During data pre-processing, I translate all tweets into English using Google machine translation. This approach is common in comparative political science studies to simultaneously analyze text in different languages (e.g., Lucas et al., 2015; Loyle and Bestvater, 2019). In addition, previous studies in computer science have demonstrated that machine translation is suitable for sentiment analysis on automatically translated texts and for conducting cross-cultural comparisons (Bautin, 2008; Balahur and Turchi, 2014). After translation, I remove numbers, stopwords, hashtags, URLs and other links to images, videos, newspaper articles, etc.

Research Design

Dependent Variable

The dependent variable is the emotional valence (i.e., sentiment or tone) expressed in the tweets. I measure the emotional valence in the content published by Chinese digital diplomacy practitioners using dictionary-based sentiment analysis.

This approach begins with a pre-defined dictionary of positive and negative words, and then uses word counts or other

²¹Khalil, Shaimaa. 2020. "Australia demands China apologise for posting 'repugnant' fake image." *BBC*. November 30. <https://www.bbc.com/news/world-australia-55126569>.

weighted measures of word incidence and frequency to score all the opinions in the data (Rice and Zorn, 2019). The general idea of dictionaries makes them relatively easy and cheap to apply across a variety of problems. For dictionary methods to work well, however, sentiment scores attached to the words must closely align with how the words are used in a particular context (Grimmer and Stewart, 2013).

The content published by digital diplomacy practitioners is primarily a political text, so following a dictionary-based approach, I use the Lexicoder Sentiment Dictionary (LSD).²² LSD is a lexicon for dictionary-based sentiment analysis specifically designed for the analysis of political texts (Young and Soroka, 2012). It has been used by scholars to analyze political text by government officials on Twitter (e.g., Silva and Proksch, 2021). LSD comprised 4,567 positive and negative words, including 1,021 words particular to political discussion that were not present in any of the core lexicons. The negated version of words (e.g., not good) is also considered.

I apply LSD to each tweet using its implementation in the R package Quanteda (Benoit et al., 2018). For each tweet, Lexicoder returns a score equal to the number of positive term matches minus the number of negative term matches. If this value is positive, the tweet has an overall positive sentiment, and vice versa. For example, this congratulatory tweet by the Chinese Embassy in Pakistan has a positive score (10): “On behalf of Chinese Ambassador Yao Jing, the Chinese Embassy would like to express our sincere thanks to all Pakistani friends for your great support for CPEC and China Pakistan friendship. The Embassy wishes you a happy and prosperous New Year in 2019”.²³ Conversely, this tweet criticizing “hardliners” in the U.S. by the Chinese Embassy in Washington has a negative score (-7): “They’ve resorted to every possible means to suppress China’s development, stoke ideological confrontation internationally, and publicly coerce countries into choosing sides, trying to drag China-US relations into confrontation and conflict. These acts risk pushing the world to the brink of turmoil and division.”²⁴ I use sentiment scores as my dependent variable (*Sentiment scores LSD*) to measure the emotional valence expressed in the tweets by Chinese diplomats.

[Figure 3]

Figure 3 plots the dependent variable, namely monthly sentiment scores over time. The x-axis is the date, the y-axis is the monthly sentiment scores, and the blue line is a locally weighted scatterplot smoothing (LOWESS) illustrating

²²Since analyses using different sentiment dictionaries on the same text may produce different results, the Appendix includes an alternative empirical analysis using the Valence Aware Dictionary and sEntiment Reasoner (VADER) to conduct sentiment analysis. VADER is a lexicon and rule-based sentiment analysis tool specifically attuned to sentiments expressed in social media (Hutto and Gilbert, 2014). The results are robust. The relationship between trade dependence and digital diplomacy’ emotional valence is strong regardless of the method used (See Appendix Tables 4 and 5).

²³Chinese Emb Pakistan (@CathayPak). 2018. Twitter. December 31. <https://twitter.com/CathayPak/status/1079746782828158976>.

²⁴Chinese Embassy in US (@ChineseEmbinUS). 2020. Twitter. September 1. <https://twitter.com/ChineseEmbinUS/status/1300867927638519808>.

the relationship between time and sentiment scores. Although there seems to be some variation, the blue line is mostly above zero, suggesting Chinese embassies and consulates generally tweet in a positive tone.

Independent Variable

The independent variable is the economic ties between the host and China. Following other studies on China's interactions with other countries (Bader, 2015; Major and Luo, 2019), I measure economic ties with trade.²⁵ I utilize one of the most common conceptualizations in the literature: trade dependence.

Trade dependence is the value of the bilateral trade between countries A and B divided by the gross domestic product (GDP) for country A (Oneal and Russett, 1997; Chen, 2021). This measure seeks to capture the share of a state's economy devoted to a particular dyadic trade relationship, suggesting the state's trade dependence on the bilateral economic relationship (Gartzke and Li, 2003). To calculate trade dependence, I use the following formula (Oneal and Russett, 1997):

Trade dependence

$$Trade\ dependence_i = \frac{(imports_{ij} + exports_{ij})}{(GDP_i)} = \frac{trade_{ij}}{GDP_i}$$

This formula denotes trade between states i and j within state i 's total economy, or state i 's trade dependence with state j . I calculate trade dependence for both host and guest countries.²⁶

One problem with analyzing the relationship between economic ties and digital diplomacy is that Twitter data is more disaggregated than trade data. Sentiment scores are aggregated to their monthly averages to match trade data.²⁷

Monthly trade data is from the International Monetary Fund Directions of Trade Statistics, while GDP data is from the World Development Indicators dataset. I use the natural logarithm of these measures for economic ties since their

²⁵Besides trade, economic ties between China and other countries can be measured using foreign aid or foreign direct investments. However, disaggregated data on Chinese foreign aid is limited to the period 2000-2014 (Dreher et al., 2017). Moreover, data for Chinese investments in other countries are not available for many countries (Bader, 2015, 26). I simply employ the most desirable measure, given the data limitations for the period analyzed. I acknowledge this limitation and welcome future studies using other measures or methods to replicate the findings.

²⁶I do not employ trade share to capture economic ties because it does not take into account the relative importance of international trade for each state's economy and, thereby, may bias the impact of trade on digital diplomacy (Gartzke and Li, 2003). While I do not employ trade share here, the Appendix has a series of alternative models estimating the effect of trade share on sentiment scores in Chinese digital diplomacy. These models provide support for the hypothesis. When using trade share, economic ties have a positive effect on the tone displayed by digital diplomacy practitioners (See Appendix Table 8).

²⁷Since trade relationships change slowly, the Appendix includes an alternative empirical analysis using quarterly aggregates of all the monthly variables as a robustness check. The results are largely the same, except Table 1 Model 2 is positive but not significant at the 0.05 level when analyzing quarterly data (See Appendix Tables 6 and 7).

distribution is highly skewed. Finally, I lag each of the explanatory variables by one month because economic ties in month t are unlikely to affect digital diplomacy's emotional valence in month t .

I also include a set of covariates that reflect findings in the extant literature and might affect the relationship between digital diplomacy and economic ties. These include the United Nations General Assembly voting similarity between China and the host (*UN voting with China*) as a proxy for China's political relationship with the host, Freedom House's "Freedom of Expression and Belief" as a measure for freedom of expression, internet users in the host as a percentage of the population, and a binary variable for COVID-19 pandemic months.²⁸

The final dataset includes a total of 1,337 observations, including 88 diverse Chinese missions and the time period is from May 2014 to December 2020. The unit of analysis is at the Twitter account-month (or Chinese mission-month) level. The data will be analyzed using linear regression models. Clearly, these variables do not represent all potential factors influencing Chinese digital diplomacy practitioners' online behavior, and I expect a Twitter account and month fixed-effects to capture remaining heterogeneity.²⁹ To address the serial correlation in the dataset, I include a lagged dependent variable and use robust standard errors.³⁰

Results

Table 1 shows the results of two linear regression models that estimate the impact of economic ties on sentiment scores in Chinese digital diplomacy. Both models provide evidence in support of the hypothesis that economic ties have a positive effect on the tone used by digital diplomacy practitioners.

Model 1 estimates the effect of the host's trade dependence with China. The host's trade dependence with China has a positive and significant effect ($p < 0.05$) on sentiment scores. We can say that for a ten percent increase in the host's trade dependence with China, the difference in the expected mean sentiment scores will be approximately 0.03 more positive. The average marginal effect of trade dependence with China is 8.74, relatively larger than both the mean (0.83) and standard deviation (0.62) of the dependent variable.

[Table 1]

²⁸Please see the Appendix for a comprehensive description of the control variables.

²⁹A Hausman test suggests that a fixed-effects model is preferred.

³⁰With these adjustments, Wooldridge tests for AR(1) errors in fixed-effects panel models suggest we cannot reject ($p > 0.05$) the null hypothesis that there is no serial correlation in the models.

Model 1 supports the hypothesis. As the host's economic ties with China increase, Chinese missions located in the host are more likely to adopt a positive tone on Twitter. Substantially, this suggests Chinese embassies and consulates are more likely to adopt a positive tone in host countries where trade with Beijing is important, such as Liberia or Chile. The control variables, UN voting with China, freedom of expression, the percentage of internet users, and the binary variable for pandemic months mostly have a positive effect on sentiment scores, but only freedom of expression is statistically significant. As expected, the lagged dependent variable is positive and significant at the 0.05 level.

Table 1 Model 2 estimates the effect of China's trade dependence with the host on the sentiment scores. Similar to Model 1, China's trade dependence with the host also has a positive and significant effect ($p < 0.05$) on the dependent variable. We can say that for a ten percent increase in China's trade dependence with the host, the difference in the expected mean sentiment scores will be approximately 0.03 more positive.

Model 2 provides further support for the hypothesis. As China's economic ties with the host increase, Chinese missions located in the host are more likely to adopt a positive tone on Twitter. This means Chinese embassies and consulates are more likely to adopt a positive tone in hosts economically important to Beijing, such as South Korea or Germany.

Since the models in Table 1 are estimated only on a subset of diplomatic missions active on Twitter for a limited time period, they each have a relatively modest sample size, and therefore produce estimates with relatively low precision. Nevertheless, they allow us to make some useful observations. Overall, these models suggest economic ties between the host and guest countries are an important factor in studying digital diplomacy, an increasingly important area in international relations.

Is it really about the economy?

Using Chinese diplomatic tweets, I demonstrate that as economic ties increase, Chinese missions in the host country are more likely to adopt a positive tone on Twitter. This section aims to test the two theoretical explanations: the opportunity cost and business legitimacy arguments. It does so by examining whether the relationship between emotional valence and economic ties depends on the topic. If a positive emotional valence in digital diplomacy serves to cultivate good public perceptions of the guest country and its economic activities, it is natural to expect that economic ties will have a positive effect on diplomatic tweets about investments, trade, and other economy-related topics. A positive tone when

discussing these topics can be used to increase the legitimacy of the guest country's business activities abroad. However, if economic ties inhibit a negative emotional valence on SNS because there are additional opportunity costs associated with it, economic ties should have a positive effect on political tweets. Politics is a sensitive area, and as such, adopting a negative tone when talking about politics should carry the highest risk of costs.

An implication of Twitter's length-limited post format is tweets end up being highly focused units of communication. A tweet generally conveys a single idea or message, which means it can be classified into mutually exclusive topical categories based on the type of message it contains (Loyle and Bestvater, 2019, 579). There are many possible classification schemes, but I follow previous studies on digital diplomacy (Bjola and Jiang, 2015; Huang and Wang, 2019) to classify tweets into four categories: economy, politics, culture, and other, as outlined in Table 2.

[Table 2]

Tweets in the *economy* topic are about China's economic achievements and economic cooperation with the international community. This category also includes messages where Chinese missions promote China as an advocate for free trade and promoter of economic growth in developing nations. Tweets in the *politics* topic are messages about domestic politics, bilateral or multilateral relations, and military cooperation. Tweets where Chinese missions mention Chinese culture and society, such as religions (e.g., Confucianism), martial arts, cuisine, etc., are classified as *culture*. I also include an *other* or off-topic category to accurately represent tweets that do not fit into any of the four categories.

I employ a supervised machine learning approach to apply the four-category classification scheme over the corpus of Chinese diplomatic tweets. The task of manually coding each of the 53,601 tweets would be highly time and labor-intensive. In addition, manually classifying thousands of documents increases the likelihood that coding becomes inconsistent and colored by a researcher's personal expectations. An unsupervised method could be used, but in this case, there are theoretically informed expectations about the kinds of messages published by Chinese overseas missions. When classifying political text into known categories, a supervised method is preferred (Grimmer and Stewart, 2013). I therefore employ a supervised multi-class classification method. Specifically, I trained a random forest model on the hand-labeled data.³¹ The model achieved an average accuracy score of 70 percent over 10-fold cross-validation.

[Table 3]

³¹Random forest exhibited the best overall performance compared to other alternatives, such as naive bayes and support vector machines (SVM) classifiers. The technical details of the random forest model are explained in Breiman (2001). Further details on the text pre-processing and model statistics by class can be found on the Appendix.

Table 3 presents the results from a series of linear regression models estimating the effect of economic ties on sentiment scores in Chinese digital diplomacy by tweet topic.³² The dependent and explanatory variables are similar to those in Table 1. If the theoretical explanations of this article are correct, then economic ties should have a positive and statistically significant effect on tweets directly or indirectly related trade, such as the *economy* and *politics* topics, but not on tweets about *culture*. The models in Table 3 have unit and time fixed-effects, and to address the serial correlation in the dataset, I include the lagged dependent variable in each model and use robust standard errors.

Model 1 and Model 4 are linear regression models assessing the impact of trade dependence between China and the host country on economy-related tweets. Both variables have a positive and significant effect ($p < 0.05$) on sentiment scores. This can be interpreted as supporting evidence for the business legitimacy argument. In Model 1, for instance, we can say that for a ten percent increase in the host's trade dependence with China, the difference in the expected mean sentiment scores for economy-related tweets will be approximately 0.03 more positive. The average marginal effect is 8.55, relatively larger than both the mean (0.98) and standard deviation (0.88) of the dependent variable. When tweeting about the economy, Chinese diplomatic missions are more likely to adopt a positive tone in countries economically dependent on China like Mauritania or Thailand.

As Model 2 and Model 5 show, trade dependence also has a positive and statistically significant effect ($p < 0.05$) on political tweets. This can be interpreted as supporting evidence for the opportunity cost argument. In Model 5, for example, a ten percent increase in China's trade dependence with the host leads to an approximately 0.03 increase in the expected mean sentiment scores for tweets about politics. The average marginal effect is 7.98, relatively larger than both the mean (0.89) and standard deviation (0.84) of the dependent variable. When tweeting about politics, Chinese diplomatic missions are more likely to adopt a positive tone in countries economically important to Beijing, such as Brazil or the U.K.

The *culture* topic is used as a type of null hypothesis to demonstrate that the statistical associations between the sentiment scores and the economy and political topics are not spurious relationships. As expected, the coefficients for the cultural topic are positive but not statistically significant. This makes sense since tweets about cultural topics like religion and cuisine should not have much tone variation and generally convey a positive sentiment.

It is not only about the economy. Economic ties have a significant effect beyond economy-related tweets. The

³²I exclude the *other* or off-topic category. Linear regression models on tweets under this off-topic category are not significant.

analysis suggests tweets about the economy and politics (but not culture) drive the positive effect of economic ties on digital diplomacy's emotional valence.

Alternative Explanations and Future Research

While the results show that as economic ties with China increase, Chinese diplomatic missions are more likely to adopt a positive tone on Twitter, especially when discussing politics and business, it is worth considering alternative explanations and future directions for research. First, the results show that as economic ties with China increase, Chinese diplomatic missions are more likely to adopt a positive tone on Twitter, especially when discussing politics and business. However, alternative explanations and future research directions are worth considering. First, economic ties and a positive emotional valence on social media may both be driven by political ties between the host and China. Countries trading with China are likely to align with it on foreign policy issues (Flores-Macías and Kreps, 2013). Additionally, Chinese missions may be more likely to adopt a positive tone in politically close countries. However, the results indicate that U.N. voting with China, a common measure of political ties, does not significantly affect sentiment scores. It is more plausible that foreign policy consequences result from trade with China rather than the opposite.

Second, a large ethnic Chinese diaspora may have a positive effect on Chinese digital diplomacy's tone and facilitate trade between the host country and China. Although it would be beneficial to have a measure of overseas Chinese in the analysis, cross-national data for overseas Chinese during the study period are not publicly available. Moreover, it is not clear whether overseas Chinese would have a positive effect on Chinese digital diplomacy's tone. While MFAs often use social media to engage with their diaspora communities, they adopt different approaches to their digital diaspora outreach. For instance, authoritarian regimes fearing political activism view their diasporas as potential saboteurs or traitors (Bjola, Manor and Adiku, 2021), which may lead Chinese missions to adopt a negative tone in countries with significant overseas communities. Other scholars could explore how cultural ties like diasporas may influence digital diplomacy.

Third, Chinese digital diplomacy's emotional valence may be driven by diplomats' career advancement ambitions. Negative tweets by Chinese overseas missions could be aimed at rivals or superiors within the Chinese government or the Chinese public to enhance the sender's reputation as a hawkish diplomat (Mattingly and Sundquist, 2022). Although a practitioner's political ambitions might influence their online tone, the Twitter account fixed-effect should help control

for account-level heterogeneity. Fourth, there might be an opportunity cost for diplomats to adopt a negative tone online in hosts with a larger economy or higher levels of trade liberalization. However, the findings are robust when variables for the size of the economy and trade openness for each state are included (See Appendix Table 3).

In closing, I note a number of future directions for research. First, there is an unexpectedly positive and significant effect for freedom of expression in the analysis, suggesting that Chinese overseas missions are more likely to adopt a positive tone in a host country with free and independent media. This may be because Chinese diplomats are aware that their tweets are being monitored and scrutinized by a broader audience than in less democratic environments. Additionally, as democratic countries tend to place a high value on freedom of speech, adopting a negative tone could be perceived as an attempt to suppress or limit opposing views, which could lead to a negative public perception. Future studies should explore the relationship between freedom of expression and digital diplomacy's emotional valence further.

In addition, it is worth using other countries to study the effect of economic ties on digital diplomacy. Although this study uses a large and diverse sample, all digital diplomacy practitioners came from one country. It is worth studying the digital diplomatic strategies adopted by other countries, especially other tech-savvy regimes like Russia or Singapore. Also, future studies can explore how other factors, such as military or cultural ties, influence digital diplomacy. Finally, future research can conduct sentiment analysis on digital diplomacy on Twitter adopting other approaches, such as machine learning or “minimally-supervised” approaches (Rice and Zorn, 2019).

Conclusion

This paper advances research on how countries are adapting public diplomacy to the digital age by taking the first step to explain why some digital diplomacy practitioners adopt a positive emotional valence on SNS while others prefer to adopt a negative one. I argue that strong economic ties between the host and guest countries lead digital diplomacy practitioners in the host to adopt a positive tone on SNS, mainly for two reasons. Firstly, economic ties discourage a negative emotional valence on SNS due to the additional opportunity cost associated with it. Secondly, a positive emotional valence helps cultivate a positive public perception of the guest country and its economic activities. To test these claims, I collect, translate, and conduct dictionary-based sentiment analysis on a large number of tweets published by Chinese embassies and consulates, and estimate a series of models to illustrate the effect of economic ties on digital

diplomacy's emotional valence. Overall, the results suggest that economic ties are an important factor to consider in the study of digital diplomacy.

Economic ties between the host and guest countries have a strong positive effect on the emotional valence of the content published by digital diplomacy practitioners. As the host's trade dependence with China increases, there is a greater likelihood that Chinese diplomats will adopt a positive tone on Twitter. This suggests that Chinese embassies and consulates are more likely to adopt a positive tone in host countries where trade with Beijing is vital, such as Angola, Chile, or South Korea. Through a systematic analysis of the topical content contained in Chinese diplomatic tweets, the results also yield that the positive effect of economic ties on digital diplomacy's emotional valence is mostly driven by tweets about politics (e.g., bilateral relations or military cooperation), and the economy, such as trade or finance.

Future studies should continue to look at digital diplomacy as a low-level information warfare tool because recent developments have demonstrated that it can have a deep impact on international relations. In 2021, for instance, France summoned China's ambassador after a Twitter brawl with a French academic over Taiwan, in which the Chinese Embassy in Paris described him as a "little thug" and "mad hyena". An issue that started in the digital arena expanded to international affairs and "created an obstacle to improving relations between China and France", as mentioned by a French official.³³ The potential consequences of digital diplomacy should not be underestimated, as misusing social media platforms can escalate tensions between nations.

³³Irish, John. 2021. "France summons Chinese envoy over 'unacceptable' insults." *Reuters*. March 23. <https://www.reuters.com/article/us-france-china-idUSKBN2BF1MU>.

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Figure 1: Chinese diplomatic missions Twitter adoption over time (2014-2020)

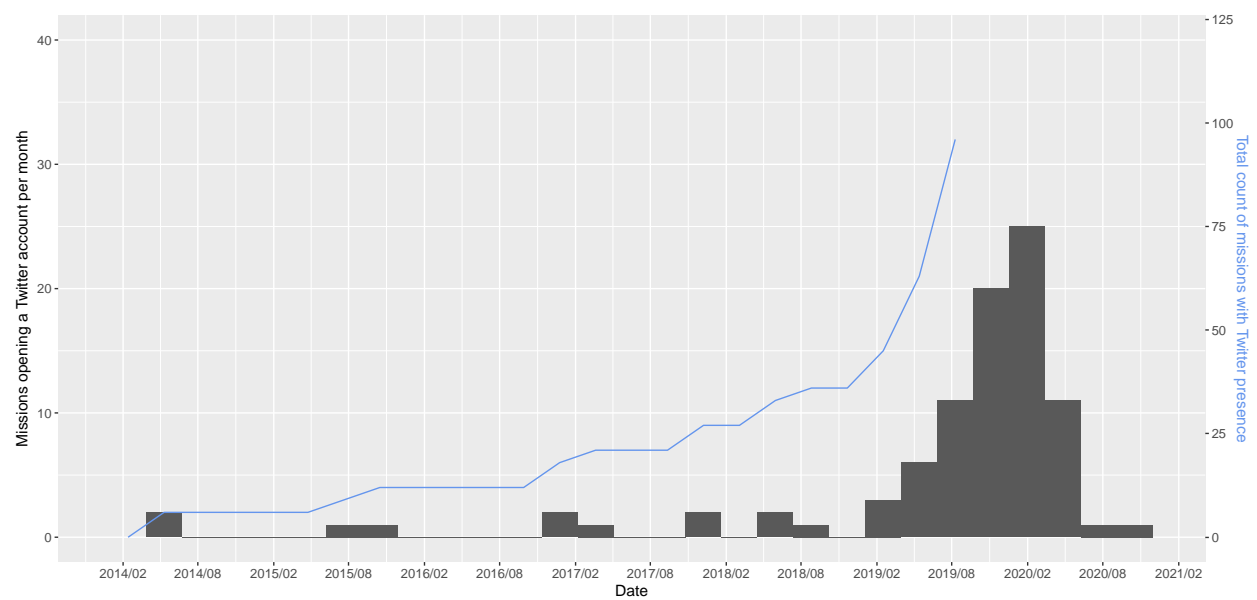


Figure 2: Chinese diplomatic missions using Twitter by country

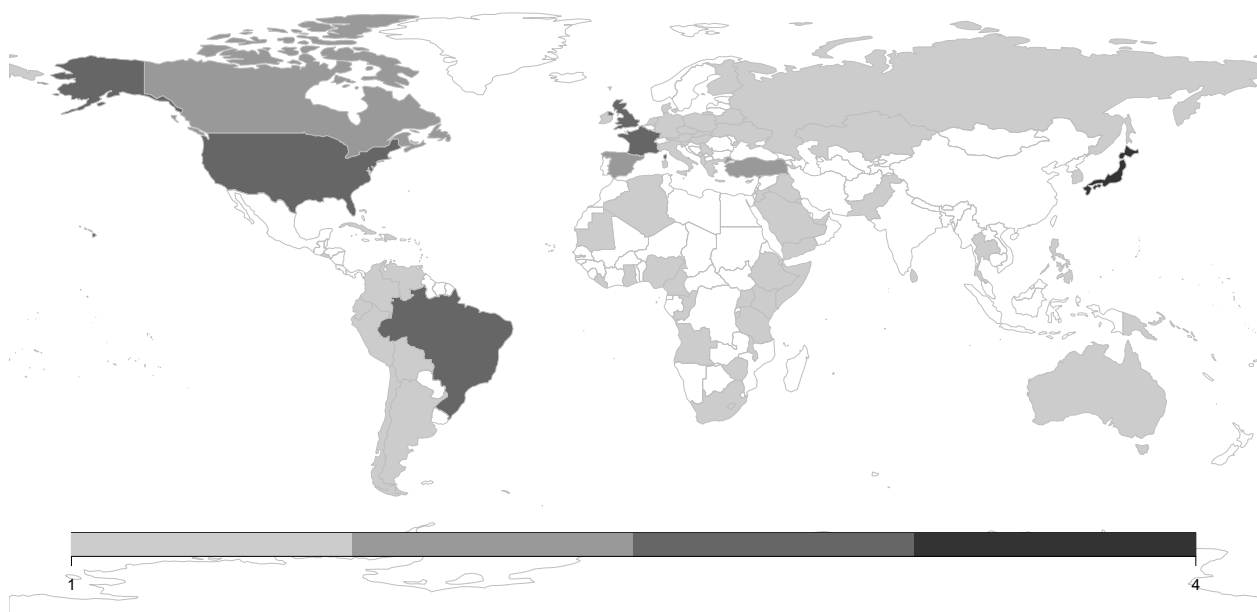


Figure 3: Sentiment analysis (LSD) on Chinese diplomatic missions on Twitter (2014-2020)

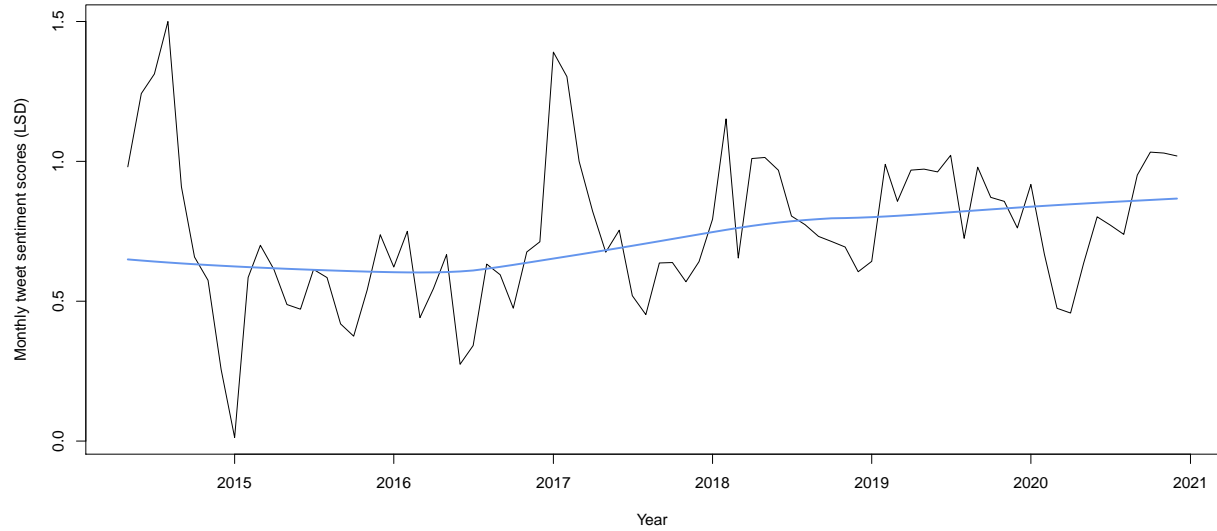


Table 1: Linear models estimating the effect of economic ties on sentiment scores in Chinese digital diplomacy

	DV: Sentiment scores LSD	
	(1)	(2)
Log (Host's trade dependence with China) t1	0.21** (0.10)	
Log (China's trade dependence with host) t1		0.36*** (0.12)
UN voting with China t1	0.13 (0.39)	-0.07 (0.42)
Freedom of expression t-1	0.20* (0.10)	0.21** (0.10)
Internet users (% pop.) t-1	0.003 (0.02)	0.004 (0.02)
Pandemic	0.04 (0.04)	0.06 (0.04)
Sentiment scores t-1	0.15*** (0.05)	0.14*** (0.05)
Fixed-effects	Yes	Yes
Observations	1,191	1,149
R ²	0.04	0.05
F Statistic	4.18*** (df = 6; 1098)	5.41*** (df = 6; 1060)

Note: Robust standard errors in parentheses.

*p<0.1; **p<0.05; ***p<0.01

Table 2 Tweet topic classification

Topic category	Possible messages	Example
Economy	China's economic achievements	“The expansion of #China in trade in services opens a new opportunity for economic growth and development of #Argentina as well as the rest of the countries of Latin America, according to the gaze of @ApolitoMaria, undersecretary at @produccion_arg.” @ChinaEmbArg; Chinese Embassy in Argentina
	Economic cooperation with host	
	Promoting economic development	
	Promoting free trade	
	Trade disputes	
Politics	Bilateral relations	“China appreciates Malawi for consistently fulfilling its commitments on Taiwan issue and believes that Malawian Side will continue to abide the One-China policy, take concrete actions to support the peaceful development of cross-strait relations and China's peaceful @ChinaEmbassy_MW; Chinese Embassy in Malawi
	Chinese domestic politics	
	Military cooperation	
	Xi-related press releases	
	Confronting criticism	
Culture	Chinese cuisine	“As one of the pillars of traditional Chinese culture, Tai Chi requires a balance between Yin and Yang, illusion and reality, strength and softness.” @AmbassadeChine; Chinese Embassy in France
	Martial arts	
	Tourist attractions in China	
	Chinese language	
Other	China's technological achievements	“Did you know that electronic games are entering the Asian Sports Games?” @ChinaEmbajadaRD; Chinese Embassy in Dominican Republic
	Visa applications	
	Local news	
	News about COVID-19	

Table 3: Linear models estimating the effect of economic ties on sentiment scores conditional on tweet topic content

	DV: Monthly sentiment scores LSD by topic					
	Economy	Politics	Culture	Economy	Politics	Culture
	(1)	(2)	(3)	(4)	(5)	(6)
Log (Host's trade dependence with China) t1	0.36** (0.14)	0.34** (0.16)	0.21 (0.31)			
Log (China's trade dependence with host) t1				0.29** (0.13)	0.32** (0.15)	0.24 (0.30)
UN voting with China t1	-0.21 (1.47)	1.14 (0.73)	0.12 (1.50)	-0.23 (1.57)	1.40* (0.72)	-0.04 (1.51)
Freedom of expression t-1	0.40*** (0.14)	0.22*** (0.06)	0.44* (0.22)	0.40*** (0.14)	0.22*** (0.06)	0.44** (0.22)
Internet users (% pop.) t-1	0.02*** (0.01)	-0.002 (0.03)	0.01* (0.01)	0.02*** (0.01)	-0.003 (0.03)	0.01 (0.01)
Pandemic	0.37*** (0.10)	0.02 (0.07)	0.20 (0.16)	0.37*** (0.10)	0.04 (0.07)	0.19 (0.16)
Sentiment scores by topic t-1	0.09 (0.16)	0.28* (0.15)	-0.40*** (0.14)	0.07 (0.16)	0.26* (0.15)	-0.41*** (0.13)
Observations	865	1,097	709	900	1,139	738
R ²	0.05	0.02	0.02	0.04	0.02	0.02
F Statistic	6.31*** (df = 6; 781)	3.43*** (df = 6; 1009)	1.86* (df = 6; 632)	5.71*** (df = 6; 812)	3.53*** (df = 6; 1047)	2.03* (df = 6; 657)

Note: Robust standard errors in parentheses.

*p<0.1; **p<0.05; ***p<0.01