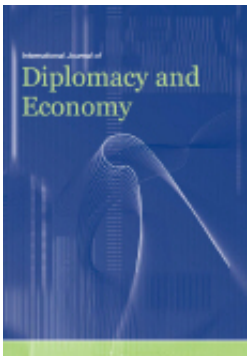

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The effects of China's wolf warrior diplomacy on the Chinese economy: a stock market perspective

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The effects of China's wolf warrior diplomacy on the Chinese economy: a stock market perspective

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Abstract: China's wolf warrior diplomacy has attracted worldwide attention since April 2020. There are discussions about the potential negative effects on the Chinese economy. Based on weekly Google Trends data during April 2020 to February 2022, this study creatively created a 'wolf warrior diplomacy index' used as a proxy measuring the aggressiveness or assertiveness of Chinese foreign policy. Using an exponential generalised autoregressive conditional heteroskedastic model, this study finds that the effects of the wolf warrior diplomacy index on the Chinese stock markets, i.e., a proxy variable for the Chinese economy, are insignificant. Various robustness tests and fundamental data also support this conclusion. The implication is that, while a country's foreign policy may potentially impact its economy, its decisive force may be primarily fundamental factors.

Keywords: China; wolf warrior diplomacy; COVID-19; EGARCH; exponential generalised autoregressive conditional heteroskedastic model; Shanghai stock exchange composite index; Google trends.

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1 Introduction

China's wolf warrior diplomacy has attracted worldwide attention recently. On 19 March 2021, during the US-China summit in Alaska, Yang Jiechi, the highest-ranking Chinese diplomat, delivered a 16-minute lecture about America's racial problems and democratic failings (WSJ, 2021). In response to the European Union (EU)'s sanctions against Chinese officials over alleged human rights abuses in China's Xinjiang region, on

23 March 2021, China sanctioned 10 EU individuals and 4 entities (Reuters, 2021). Back in 2020, Chinese diplomats fought fire with fire, defending against accusations from the West and 2020 was a year of 'wolf warrior' (Financial Times, 2020a).

The 'wolf warrior diplomacy' is defined as a new offensive approach adopted by Chinese diplomats to defend China's national interests, often in confrontational ways (Zhu, 2020). Wolf warrior diplomacy can potentially cause negative effects on the Chinese economy. These negative effects may come from two areas. First, it may negatively affect corporate investment. For example, the EU-China Comprehensive Agreement on Investment, which was concluded in principle in December 2020, was assumed to help attract European investment to China. However, after China sanctioned the EU parliamentarians, the review process of this deal has been delayed and may 'take another seven years' (Financial Times, 2021). Second, wolf warrior diplomacy may also hurt China's international trade. For example, as argued by Akçevin (2021), the rise of negative attitudes towards (at least partially the result of China's wolf warrior diplomacy) would cause foreign audiences to reject Chinese products and services. For example, after the India-China border conflict in May 2020, many Chinese apps were forbidden by the Indian authorities (Economic Times, 2020), and the Confederation of All India Traders called for a boycott of 3000 Chinese products (The Print, 2020). From June 2020, as a result of China's handling of Covid-19 and potentially pushing back on China's assertive foreign policy, many people in the West, such as 40% of Americans (Bloomberg News, 2020, 2021), half of Britons (The Express, 2020) and 88% of Australians (7news, 2020), support boycotting Chinese products. So, China's wolf warrior diplomacy may eventually hurt the Chinese economy.

While there are already some studies on China's wolf warrior diplomacy, including its definition, causes, and political effects (see Sub-section 2.1 for details), this study looks at its effects on stock markets, which can be seen as a proxy variable for the economy. This study also adds to the growing literature on the effects of political uncertainty, such as political development (Kim and Mei, 2001), elections (Vuchelen, 2003; Jensen and Schmith, 2005), and regime change (Chau et al., 2014) on stock markets and the economy.

In particular, this study is related to the niche field that examines the relations between diplomacy and the economy. Many studies have explored various topics such as human rights and international business (Justinek, 2019), corporate and medical diplomacy (Justinek, 2021a) and others (Justinek, 2018, 2021b). This study makes a novel contribution to this field by looking at these relations through the lens of stock markets. The model adopted is the exponential generalised autoregressive conditional heteroskedasticity (EGARCH) model (see Sub-section 3.2 and Appendix 2 for details).

The structure of this paper is as follows: Section 2 presents an introduction to China's wolf warrior diplomacy and the wolf warrior diplomacy index. Section 3 analyses the effects of China's wolf warrior diplomacy on Chinese stock markets by employing the EGARCH model. Section 4 concludes this paper.

2 Wolf warrior diplomacy

In this section, first, some conceptual analysis and literature review on China's wolf warrior diplomacy are conducted. Second, based on Google Trends data, a wolf warrior

diplomacy index was introduced to measure the assertiveness or aggressiveness of China's foreign policy. Third, the research gap is analysed.

2.1 Concepts and literature

Wolf Warrior is in fact the title of a 2015 Chinese action film. A sequel, titled *Wolf Warrior 2*, was released in China on 27 July 2017 and became China's second highest-grossing film of all time (as of 1 July 2022).[1] They both deal with how Chinese soldiers fought their enemies and defended China's interests. Its slogan is 'whoever offends China will be punished, no matter how far away' (in Chinese: 犯我中华者，虽远必诛). The 'wolf warrior diplomacy', which is named after these movies, is defined as the new offensive approach adopted by Chinese diplomats to defend China's national interests, often in confrontational ways (Zhu, 2020).

There are already some studies on China's wolf warrior diplomacy. For example, Cheng (2020) looked at this new diplomatic style against the background of China's foreign policy transition under President Xi Jinping and claimed that China's wolf warrior diplomacy is part of China's more prominent and assertive foreign policy. Zhu (2020) analysed the causes of China's wolf warrior diplomacy, i.e., China's soaring nationalism, telling the China story, and the personal incentivisation of Chinese diplomats. Besides personal incentives for assertiveness, Loh (2020) claimed that President Xi Jinping's foreign policy ambitions and a generational shift at the Ministry of Foreign Affairs should also be accountable. Besides China's soaring nationalism, Chu (2021) claimed that the rising pressure on China is another cause. Brandt and Schafer (2020) examined the role of Twitter in China's wolf warrior diplomacy. Akçevin (2021) explored the potential impact of wolf warrior diplomacy on China's soft power prospects. Wang (2021) believed that the wolf warrior diplomacy discourse may be associated with the China threat theory.

2.2 Wolf warrior diplomacy index

2.2.1 Google trends

Google Trends (https://trends.google.com/trends/) is a Google product that looks at how popular Google search queries are in different countries/regions and languages. Anonymity, topic classification, and aggregation are some of its features. Google Trends offers real-time data for the last seven days, daily data for a limited time, and weekly and monthly data for a longer period. Because Google handles a significant number of inquiries every day, Google Trends only uses samples of Google searches. Google Trends search results are also normalised for time and location. That normalisation is critical since the number of people searching on Google changes all the time. For example, search traffic in 2004 was far lower than it is now, so raw search counts wouldn't allow users to compare searches then and now. After normalising the data, it is feasible to compare searches across time and locations. The normalisation method is as follows, according to the official Google Trends document: to assess relative popularity, 'each data point is divided by the total searches of the geography and time range it represents'; 'the resulting numbers are then scaled on a scale of 0 to 100 based on the proportion of searches on all topics'; locations with equal levels of interest in a term might have vastly different total search volumes. In a nutshell, the data represent search

interest in relation to the highest point on the map for the provided place and time period. A score of 100 means that the phrase is at its most popular, a score of 50 shows that it is half as popular, and a score of 0 indicates that there isn't enough data to assess the term's popularity.

Google Trends has been applied in various fields through hundreds of studies in various fields such as information systems and computer science, healthcare, political science and international relations, and economics, business and finance (Jun et al., 2018). In particular, in finance, it is widely accepted that Google Trends data can be used to predict stock returns. However, how to interpret the Google Trends data varies. A majority of these studies interpreted Google Trends as a measurement of investment sentiment, i.e., the behaviour factor (Gao et al., 2020; Da et al., 2015; Huang et al., 2020; Szczygielski et al., 2021). A few others interpreted Google Trends as a combination of fundamental and behavioural factors. For example, Vasileiou (2021) argued that Google Trends searches bridge the gap between behavioural lists and efficient market hypothesis supporters. According to Preis et al. (2013), Google Trends data reflects aspects of the current state of the economy as well as some insight into future trends in the behaviour of economic actors. Salisu et al. (2021) stated that 'in seeking information to guide investment decisions, investors' sentiments are shaped by news such as G(oogle)-trends that could induce changes in the prices of stocks', i.e., interpreting Google Trends as a combination of both fundamental and behavioural factors. The problem is that none of the previous studies has examined the nature of Google Trends data.

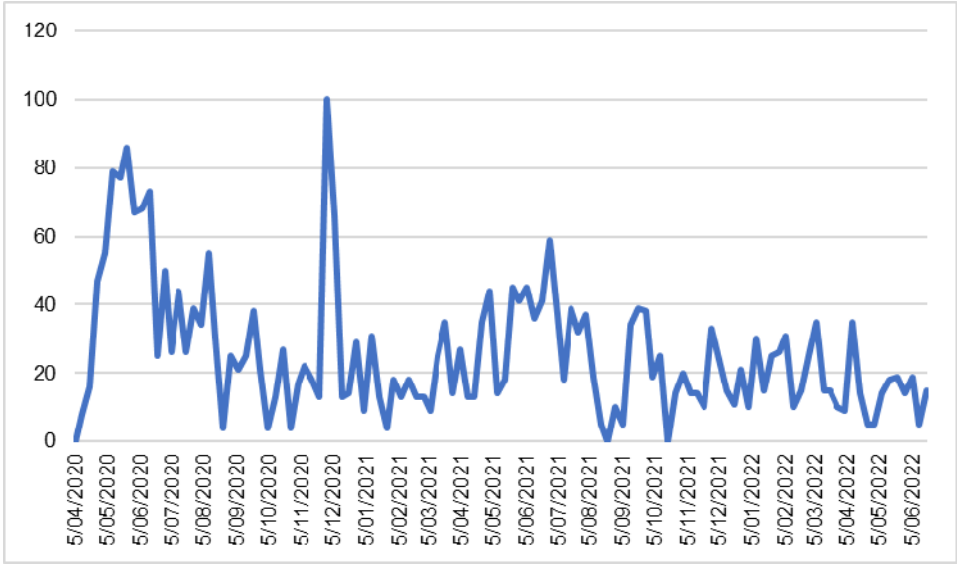
From the viewpoint of communications, Scharkow and Vogelgesang (2011) interpreted Google Trends, which was called Google Insights for Search back then, as a measurement of the public agenda, i.e., those issues that the public thinks are the most important. However, they did not examine the information content of Google Trends search results. As shown in this study (see Sub-section 2.2.2 below), Google Trends results are more like the measurement of the agenda-setting effect, '(which) is not the result of receiving one or a few messages but is due to the aggregated impact of a very large number of messages, each of which has a different content but all of which deal with the same issue' (Dearing et al., 1996). Google Trends may be able to measure the true and aggregated impact of a topic on the general public through policy, media coverage, and individuals' issue attentiveness. From the viewpoint of finance, Google Trends contains more fundamental information related to the key phrase searched than behaviour factors if any.

One concern is that the meaning of search terms used may not be consistent with their original meaning (Gruszczynski and Wagner, 2017; Ripberger, 2011). However, this issue emerges mainly for single-word searches. As this study uses a more complicated search structure, i.e., multiple words, this issue has become less severe, if not totally resolved.

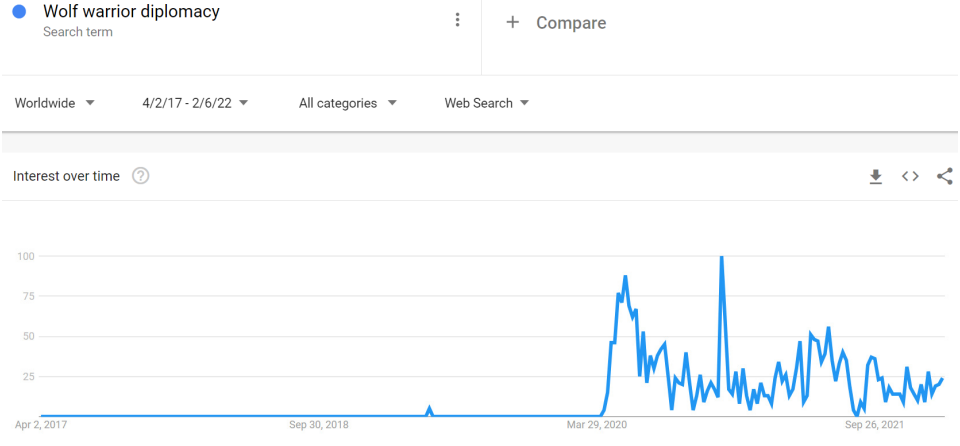
2.2.2 Wolf warrior diplomacy index

The key phrase 'wolf warrior diplomacy' is used. The results contain all the words in any order, along with other words. Below, Figure 1 shows the search results, which are defined as China's Wolf Warrior Diplomacy Index (WWDI). It measures the assertiveness or aggressiveness of China's foreign posturing from the viewpoint of the English-speaking world.

Figure 1 China's Wolf Warrior Diplomacy Index (WWDI) based on Google trends (key phrase: Wolf warrior diplomacy. geographic location: worldwide. frequency of data: weekly)



(A) Time period: 5 April 2020 – 6 February 2022



(B) Time period: 2 April 2017 – 6 February 2022

Figure 1(B) shows that before 5 April 2020, there were almost no data points for wolf warrior diplomacy. As a result, the time period of this study is 5 April 2020 to 6 February 2022.

Figure 1(A) shows that the largest peak of the wolf warrior diplomacy index happened in the weeks starting on 29 November 2020. China launched a brutal wolf warrior diplomacy in Australia in the week beginning 22 November 2020 (Lucanus, 2020), attracting extensive international attention. The Australian prime minister demands an apology for a Chinese official's use of a doctored image showing an

Australian soldier threatening an Afghan child (Winning, 2020). After the Chinese embassy in Australia provided a detailed list of 14 grievances that China had against Australia, it publicly said that '*If you make China the enemy, China will be the enemy*', and imposed import taxes of up to 212.1% on Australian wine (Deutsche Welle, 2020), The Financial Times (2020a, 2020b) advocated in an editorial that democratic countries keep a close eye on this dispute and be ready to assist one another in resisting Chinese pressure.

The second-largest peak of the wolf warrior diplomacy index happened in the week starting on 24 May 2020. This week, when Chinese foreign minister Wang Yi was asked during the national legislative meeting, or 'two sessions,' whether China had abandoned its low-key approach in light of the confrontational stance adopted by some diplomats, Wang defended China's combative wolf warrior diplomacy, saying that China would stand firm in defending China's national interests and combating smears (SCMP, 2020). Weeks before that, the Chinese Foreign Ministry had adopted an aggressive new stance, aiming to increase China's global influence. For example, according to WSJ (2020), China's ambassador in Paris threatened to battle France if China's interests were hurt, then publicly fought France over the Covid-19 pandemic. The Chinese embassy in Sri Lanka bragged about China's pandemic response. After a squabble with the city's mayor over Taiwan, China cancelled a nationwide tour by the Prague Philharmonic Orchestra. Mr. Wang's statements formally verified China's new diplomatic stance, which then attracted extensive coverage (Westcott and Jiang, 2020; Williams, 2020; Huang, 2020) and analyses of its potential effects (The Economist, 2020).

The above content shows that the wolf warrior diplomacy index is highly related to the fundamental information of China's foreign policy.

2.3 Research gap

As discussed in Sub-section 2.1, there are already some studies on China's wolf warrior diplomacy, such as its origin, definition, causes in the background of China's foreign policy transition, as well as its political effects. However, except for some very general comments, no studies have systematically examined its economic effects. This study fills this gap by examining the effects of China's wolf warrior diplomacy on the Chinese economy. As discussed in Sub-section 2.1, this study creatively created a wolf warrior diplomacy index. This index, together with stock market data, was entered into an EGARCH model to examine the relations, which are discussed in detail below in Section 3.

3 Empirical modelling

As discussed in Section 1, China's wolf warrior diplomacy may hurt its economy. However, in truth, because of the many variables at play, it is beyond the capacity of economics to deliver a precise answer regarding the exact costs. In this section, a different approach is adopted, i.e., the response of the stock markets. First, the variables are introduced. Second, EGARCH models are introduced in Sub-section 3.2. Third, the results are presented in Sub-section 3.3. Fourth, various robustness tests are conducted in Sub-section 3.4.

3.1 Variables

The dependent variables are the weekly returns of the SSECI (Shanghai Stock Exchange Composite Index), a stock market index of all stocks (A shares and B shares) that are traded on the Shanghai Stock Exchange. It represents the stock market's overall performance in China. All data sets are retrieved from https://finance.yahoo.com.

Besides, the Google Trends data-based *WWDI*, reflecting the assertiveness or aggressiveness of China's foreign policy, another independent variable is monetary policy. Previous studies have overwhelmingly concluded that monetary policy has a significant effect on stock markets (Ioannidis and Kontonikas, 2006; Hussain, 2011). First, there is a direct effect on stock returns by altering the discount rate used by market participants. Easing monetary policy leads to a drop in the rate at which firms' future cash flows are capitalised causing stock prices to increase. Second, a change in monetary policy exerts an indirect effect on the firms' stock values by altering expected future cash flows. Monetary policy easing is expected to increase the overall level of economic activity, resulting in higher cash flows in the future and a stock price that responds positively. Liu (2021, 2022) concluded that the FDR007 (the fixed 7-day repurchase rate by deposit-taking institutions in China's interbank market) outperforms the FR007 (the fixed 7-day repurchase rate by both deposit-taking institutions and non-deposit-taking institutions) with respect to policy target rates. As a result, the FDR007 is chosen as the policy rate.

It may also be argued whether Covid-19 should be a factor for consideration. Various studies have shown that during the early stage of the pandemic, i.e., early 2020, Chinese stock markets were severely affected by Covid-19 (Sun et al., 2021; Liu et al., 2021, 2020). The issue is that during the sample period of this study, i.e., from April 2020 to February 2022, the pandemic was generally under control (see Appendix 1). One important indicator is that China's policy interest rate has been back to normal (see Appendix 1). The effects of Covid-19 on Chinese stock markets during the sample period, if any, should be insignificant.

Unit root tests (Augmented Dickey–Fuller tests) show all data are stationary. The results, together with descriptive statistics, are presented below.

Table 1 Variables (SSECI is the weekly returns of the Shanghai Stock Exchange Composite Index; WWDI is the Google Trends-based wolf warrior diplomacy index; FDR007 is the weekly average of fixed 7-day repurchase rates by deposit-taking institutions in China's interbank market)

(A) Unit Root Tests (Augmented Dickey-Fuller test).

	t-Statistic	*Prob.*
SSECI	–10.656	0.000
WWDI	–5.217	0.000
FDR007	–4.343	0.001

Table 1 Variables (SSECI is the weekly returns of the Shanghai Stock Exchange Composite Index; WWDI is the Google Trends-based wolf warrior diplomacy index; FDR007 is the weekly average of fixed 7-day repurchase rates by deposit-taking institutions in China's interbank market) (continued)

(B) Descriptive Statistics.			
	SSECI	*WWDI*	*FDR007*
Mean	0.003	26.990	2.087
Median	0.003	21.500	2.140
Maximum	0.073	100.000	2.860
Minimum	–0.05	0.000	1.240
Std. Dev.	0.021	19.634	0.257
Skewness	0.051	1.316	–1.59
Kurtosis	3.959	4.827	7.149
Observations	96	96	96

Notes: Null Hypothesis: Variable has a unit root. Time Period: 5 April 2020 – 6 February 2022. No of Observations: 96.

3.2 Models

As argued by Lin (2018), time-varying and clustering properties are prominent in Chinese stock markets. Leptokurtosis with significant autoregressive conditional heteroskedasticity (ARCH) and generalised autoregressive conditional heteroskedasticity (GARCH) effects can be found in its series distribution. Lin (2018) concluded that exponential GARCH (EGARCH) (1, 1) outperforms the others by contrasting the fitting and prediction performance of GARCH (1, 1) (symmetric), Threshold ARCH (TARCH) (1, 1) and EGARCH (1, 1) (asymmetric). The empirically established fact that negative shocks have a higher impact on the variance than positive shocks is captured by the EGARCH model, which is not considered by the GARCH models. Several GARCH family models were also conducted to choose the best fit model. According to the Akaike Information Criteria, the EGARCH model is the most appropriate.

The presence of heteroscedasticity in data series needs to be confirmed. This can be achieved through the ARCH effect test, i.e., large volatility is usually followed by another large volatility, and a little fluctuation is usually followed by another even smaller volatility. Regarding SSECI, according to the smallest Akaike information criteria, lag order 2 is chosen for the mean equation. It can be written as follows: SSECI = 0.003–0.126* SSECI(–1) – 0.203* SSECI(–2) .

The autocorrelation test on the squared residuals of SSECI using the ARCH (2) model is presented in Table 2. It shows the values of autocorrelation, partial correlation, the Q statistic and their corresponding probabilities. The *P*-value of the first three lags is significant at a 10% critical level. Therefore, the null hypothesis that the residuals of data series are independently distributed is rejected. We can conclude that the original data series has an ARCH effect.

Table 2 Correlogram squared residuals of the mean equation

Autocorrelation	*Partial correlation*		*AC*	*PAC*	*Q-Stat*	*Prob*
. |** |	. |** |	1	0.254	0.254	6.2429	0.012
. |. |	. |. |	2	0.009	–0.059	6.2505	0.044
. |. |	. |. |	3	–0.030	–0.019	6.3417	0.096
. |. |	. |. |	4	–0.027	–0.014	6.4131	0.170
.*|. |	.*|. |	5	–0.075	–0.071	6.9833	0.222

Furthermore, it is assumed that residuals are normally distributed (this is verified by the residuals test). Considering that the expected return on an asset is related to the expected risk, the GARCH-in-Mean model is used. The estimated coefficient on the expected risk is a measurement of the risk-return trade-off.

For the WWDI (see Figure 1(A)), the level variable is used in the mean equations, and the change (first difference) variable is used in the variance equations. It makes more sense to examine the effects of changes in the wolf warrior diplomacy index on stock market volatility. For the monetary policy variable, the change variable is used in both mean and variance equations.

The model specification is presented in Appendix 2. It is noted that the choice of lag orders is based on the smallest Akaike information criterion.

3.3 Results

The regression results are presented below in Table 3. The variance equation is not reported but is available upon request.

Table 3 An EGARCH model: the effects of China's wolf warrior diplomacy on the Chinese stock market

Variable	*Coefficient*	*Prob.*
Log(Variance)	–0.007	0.0%
C	–0.056	0.0%
D(FDR007(–2))	–0.055	0.0%
WWDI	0.0001	68.8%
WWDI(–1)	–0.0002	13.2%
WWDI(–2)	0.0002	26.3%

Notes: Dependent Variable: *SSECI* (the weekly return of the Shanghai Stock Exchange Composite Index). Independent variables: *D(FDR007)* (the first difference in the weekly average of China's FDR007, the fixed 7-day repurchase rate by deposit-taking institutions in China's interbank market), and *WWDI* (China's wolf warrior diplomacy index).

Method: ML ARCH – Normal distribution (Marquardt / EViews legacy). Sample (adjusted): 5 April 2020 to 6 February 2022. Included observations: 93 (weekly data) after adjustments. Convergence is achieved.

Residual tests (see Appendix 3) show that the model works well. Neither the standardised residuals nor the squared standardised residuals show any signs of persistence, suggesting that there are no residual autocorrelations or ARCH effects. The residuals are also normally distributed, which is consistent with the assumption.

For the mean equation, the coefficients of *WWDI* are always insignificant at a 10% confidence level. It means that the effects of wolf warrior diplomacy on the mean level of stock returns are insignificant.

In reality, economic data shows that the negative effects of China's wolf warrior diplomacy on the Chinese economy, if any, may be insignificant. According to data compiled by the United Nations Conference on Trade and Development, while global Foreign Direct Investment (FDI) fell 35% in 2020, including a 58% drop in developed countries and an 8% drop in developing countries, China experienced a 6% growth rate (UNCTAD, 2021). In 2021, China's FDI inflow grew by 21%, 'powered by strong investment in services and high-tech sectors, where the outlook also remains positive for 2022' (UNCTAD, 2022). In 2021, China's goods exports grew 29.9%, outperforming expectations for much of 2021 (Reuters, 2022). The main reason is that Covid-19 has been generally under control in China, and the economy has nearly returned to pre-Covid-19 times (as of February 2022) (Liu, 2022). At the same time, the rest of the world generally lagged behind China in terms of controlling Covid-19 and re-opening (as of February 2022). As a result, the negative results of China's wolf warrior diplomacy may be insignificant. The implication is that, while China's aggressive or assertive foreign policy may potentially hurt its economy, the decisive factors should primarily be fundamental indicators such as quantity and quality of infrastructure, the sophistication of the supply chain and the competitiveness of cost and price, and so on.

Furthermore, the risk factor is significantly negative. This may be related to the uniqueness of Chinese stock markets. Also, as expected, an interest rate cut (hike) can significantly drive (reduce) stock returns.

3.4 Robustness tests

In this part, a series of robustness tests were conducted. They include different choices of the sample period and different wolf warrior diplomacy indices.

First, there may be a structural change in China's wolf warrior diplomacy from 31 May 2021, when Chinese President Xi Jinping said that China should endeavour to 'portray an image of a reliable, lovely, respectable China' (Birtles, 2021). So, the sample period from 20 April 2020 to 21 May 2021 was chosen. Tests show that all variables are stationary and the mean equation also has ARCH effects. The results based on an EGARCH model show that the coefficient of *WWDI* is still insignificant (results are not reported but are available upon request).

Second, while Sub-section 3.3 adopted weekly data, daily datasets may also need to be tried. According to the rules of Google Trends, daily data can span as long as 8 months. Accordingly, daily datasets from 16 April 2020 to 16 December 2020 were retrieved from Google Trends. There are a total of 162 data items. The results based on an EGARCH model still show that the coefficient of *WWDI* is insignificant (results are not reported but are available upon request).

Third, while previous wolf warrior diplomacy indices are based on worldwide data, China-based data may also need to be tried. The main consideration is that they matter the most to Chinese stock markets. However, the key phrase 'wolf warrior diplomacy' generates zero results. Also, the key phrase '战狼 **外交** (in English 'wolf warrior diplomacy') generates too few data items (see Appendix 4). It means that the Chinese public (Chinese investors) generally do not care too much about this assertive or

aggressive diplomatic posturing. This may also explain why the effects of wolf warrior diplomacy on Chinese stock markets are insignificant.

Fourth, while previous models all use Google Trends data, Baidu data may also need to be tried. Baidu Index (https://index.baidu.com/v2/index.html#/) is a product of Baidu, which is the second-largest search engine in the world and the largest in China. From January 2020 to May 2022, its market share in China ranges from 64 to around 87%.[2] Unlike Google Trends, Baidu search results use the population rather than sample data. Moreover, unlike Google Trends, Baidu search may censor some sensitive key phrases and/or results. The wolf warrior diplomacy index based on Baidu data only start on 20 December 2020 (see Appendix 5). Since there were no ARCH effects, the robust least-squared model was adopted. The results show that the coefficient of *WWDI* is insignificant (results are not reported but are available upon request).

4 Concluding remarks

China's wolf warrior diplomacy has attracted worldwide attention since April 2020. Based on weekly Google trends data during April 2020 to February 2022, this study creatively created a wolf warrior diplomacy index to measure the assertiveness or aggressiveness of Chinese foreign policy. Based on an EGARCH model, this study finds that the potentially negative effects of China's wolf warrior diplomacy on Chinese stock markets are insignificant. Using the response of stock markets as a proxy variable measuring the performance of the real-economy, it means that, while it is speculated that China's assertive or aggressive diplomatic posturing might hurt its economy, these effects are largely insignificant. This conclusion is supported by fundamental data and various robustness tests. The implication is that, while a country's foreign policy may potentially impact its economy, its decisive force may be primarily fundamental.

From the viewpoint of academics, this study contributes to the literature on the relations between political uncertainty and stock markets (economy), in particular, a shift in diplomatic style and its economic effects under the background of rising Chinese influence around the world. This study also contributes to academia by creatively creating an index to measure the assertiveness or aggressiveness of Chinese foreign policy. From the viewpoint of policy-makers, this study also makes significant contributions by providing a robust analysis of a very important topic.

This study also has its limitations. For example, the *WWDI* is interpreted as a proxy variable to measure the assertiveness or aggressiveness of China's diplomatic posturing from the viewpoint of the English-speaking world. This study did not systematically examine China's diplomatic narratives, policies and state behaviours. Also, as a developing economy, there might be some disconnection between the performance of China's real-economy and its stock markets. Readers are advised to be cautious in drawing strong conclusions. More research needs to be done in the future.

There is great potential for future research. In particular, this study introduces a new data source that has the potential to generate rich (monthly, weekly, or daily) time series data to measure the public agenda. This study concludes that Google Trends contain fundamental information. The approach that measures these relations between diplomacy and the economy through the lens of stock markets can also be applied to other countries.

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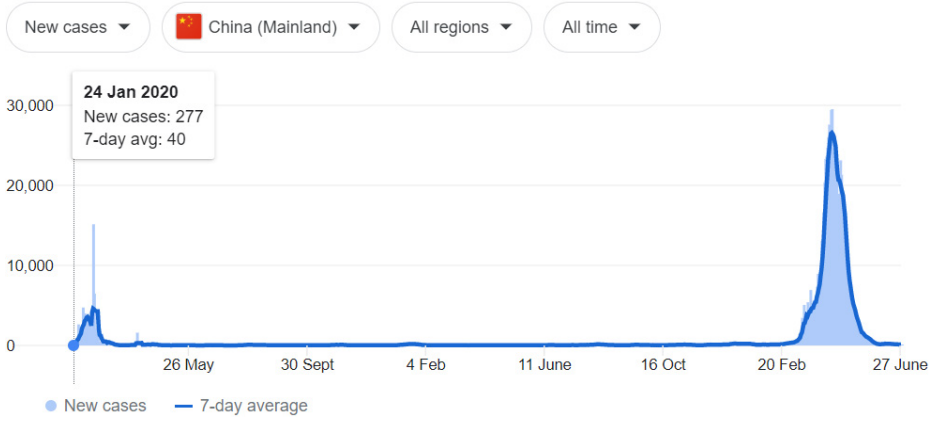
1 See (https://en.wikipedia.org/wiki/List_of_highest-grossing_films_in_China)

2 Source: (https://gs.statcounter.com/search-engine-market-share/all/china)

APPENDIXES

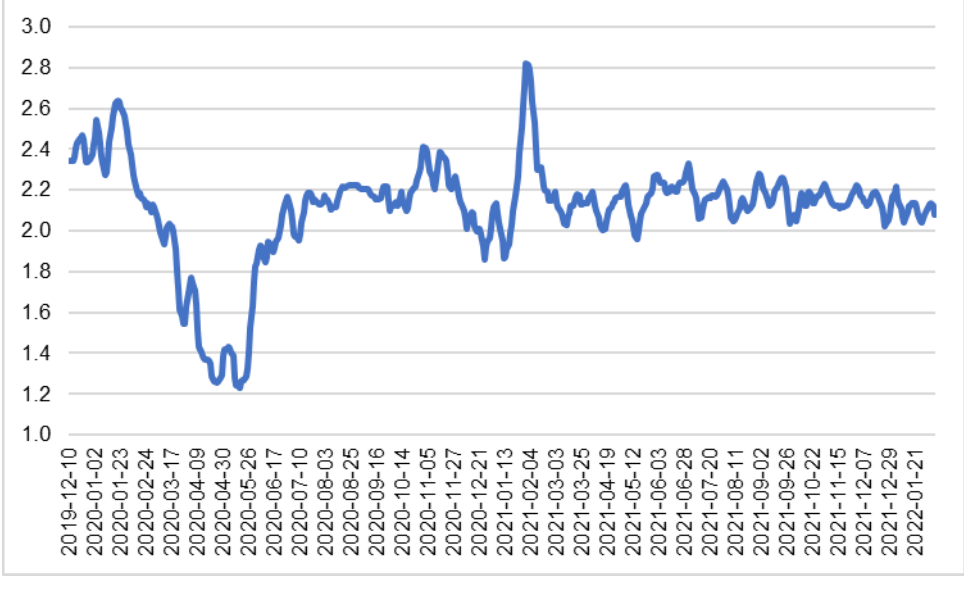
Appendix 1: The Chinese economy is back to normal during April 2020 to February 2022

A. New Daily Covid-19 Cases in China: Jan 2020 – June 2022



Source: https://ourworldindata.org/coronavirus-data

B. China's Policy Interest Rate (FDR007, 7-day moving average) During December 2019 – February 2022



Source: https://www.chinamoney.com.cn/chinese/bkfrr/

Appendix 2: EGARCH model

Mean equation: $r_t = a_1 * Risk + c + a_2 * r_t - _i + a_3 * D\_FDR007_t - _i + a_4 * WWDI_t - _i + \varepsilon_t$

where r_t is the weekly return of a stock index (SSECI) at time *t*, *Risk* is the conditional variance, conditional standard deviation, or log of the conditional variance, the parameter a_1 is the risk premium, *c* is the average return, *D_FDR007* is the first difference of FDR007 (China's policy interest rate), *WWDI* is China's wolf warrior diplomacy index based on Google Trends search results, a_4 shows the effects of wolf warrior diplomacy index on stock index returns and ε_t is the residual.

Variance Equation: $\ln\left(\sigma_t^2\right) = \omega + \beta_1 * \left[|\varepsilon_{t-1} / \sigma_{t-1}| - \right] + \beta_2 * \varepsilon_{t-1} / \sigma_{t-1} + \beta_3 * \ln\left(\sigma_{t-1}^2\right) + \beta_4 * D\_FDR007_t - _i + \beta_5 * D\_WWDI_t - _i$

where $\ln\left(\sigma_t^2\right)$ is the logarithmic form of the conditional variance, ω is the constant term, β_1 shows the impact of volatility from the last period, i.e., the ARCH effect, β_2 shows the effect of leverage and asymmetry, β_3 shows the persistence of the conditional variance of the previous period, i.e., the GARCH effect and β_5 shows the effects of the change in wolf warrior diplomacy index on variance. The presence of leverage effects can be tested by the hypothesis that $\beta_2 < 0$. The impact is asymmetric if $\beta_2 \neq 0$.

Appendix 3: Residual tests

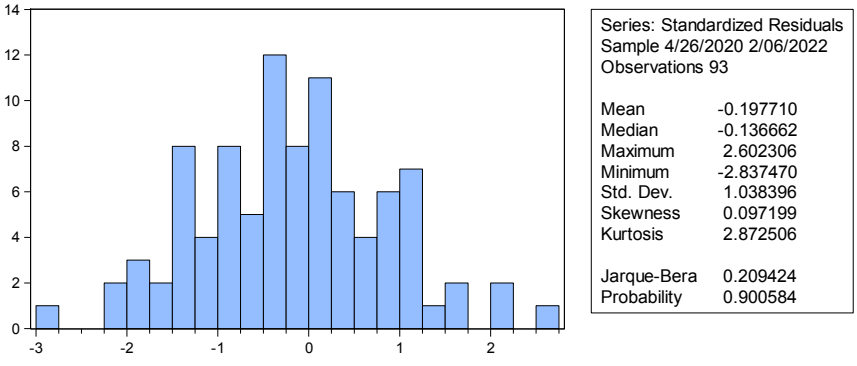
A. Correlogram of standardised residuals

Autocorrelation	*Partial correlation*		*AC*	*PAC*	*Q–Stat*	*Prob**
. |* |	. |* |	1	0.135	0.135	1.7601	0.185
. |. |	. |. |	2	0.072	0.055	2.2704	0.321
. |. |	. |. |	3	0.036	0.019	2.3945	0.495
. |* |	. |* |	4	0.093	0.084	3.2585	0.516
. |. |	.*|. |	5	–0.039	–0.066	3.4109	0.637

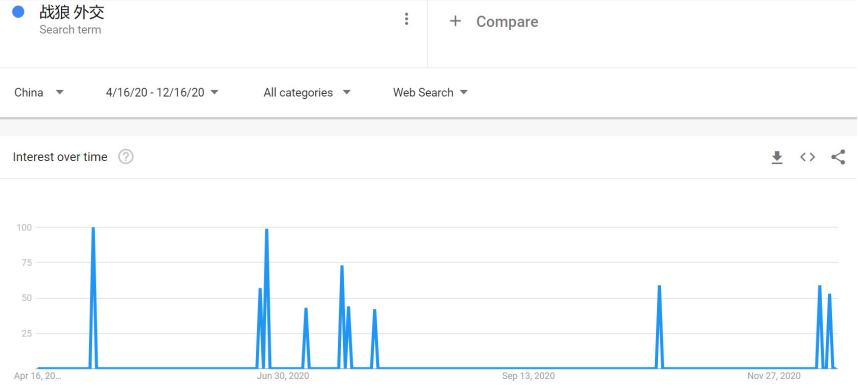
B. Correlogram of standardised residuals squared

Autocorrelation	*Partial correlation*		*AC*	*PAC*	*Q–Stat*	*Prob**
.*|. |	.*|. |	1	–0.132	–0.132	1.6782	0.195
. |* |	. |* |	2	0.099	0.083	2.6252	0.269
. |* |	. |* |	3	0.095	0.120	3.5033	0.320
.*|. |	.*|. |	4	–0.089	–0.073	4.2924	0.368
.*|. |	**|. |	5	–0.161	–0.211	6.8793	0.230

A. Normality test

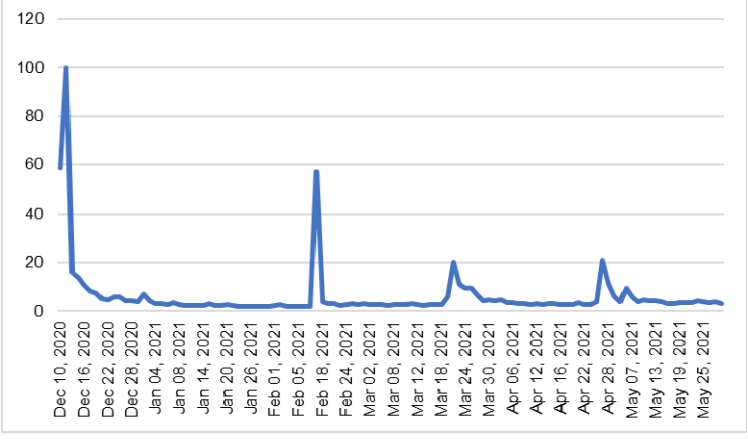


Appendix 4: Wolf warrior diplomacy index – Chinese key phrase



Notes: China's Wolf Warrior Diplomacy Index based on Google Trends. Key phrase: 战狼 **外交** (in English 'Wolf Warrior Diplomacy'). Geographic location: China. Frequency of data: daily.

Appendix 5: Wolf warrior diplomacy index: Baidu index



Notes: Key phrase: 战狼外交 (in English 'Wolf Warrior Diplomacy'). Frequency of data: daily.