Research on an International Trade Policy Evaluation Model Based on Global Public Opinion

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Abstract: This paper, based on policy informatics and public policy evaluation theory, combines practical experience in the field of international trade policy to propose an evaluation model adapted to the current domestic and international context. By analyzing global media coverage, the paper explores how big data technology can be utilized to assess the impact of international trade policies. Specifically, the study employs data sources such as GDELT (Global Database of Events, Language, and Tone) to construct an evaluation model with multidimensional indicators, including public opinion analysis, sentiment index, and word frequency analysis. This model combines both quantitative and qualitative approaches to assess the global influence of international trade policies. The research demonstrates that the selected indicators and model can effectively identify and evaluate global public reactions to policy implementation, providing real-time and effective information support for the formulation, evaluation, and adjustment of global trade policies. By monitoring public opinion in key countries (regions) and international organizations, the model assists decision-makers in identifying abnormal shifts in public sentiment in a timely manner, enabling more accurate policy evaluation and adjustments. Furthermore, the paper emphasizes that, in the context of globalization, the evaluation mechanism for international trade policies can be further optimized by integrating dynamic public opinion, stakeholder positions, and public attention, thereby enhancing policy transparency and international competitiveness.

Keywords: Big Data; International Trade; Policy Evaluation; Global Public Opinion

1. Introduction

Since April 2018, when the U.S. Trade Representative announced a 25% tariff on $50 billion worth of Chinese exports, China and the U.S. have experienced multiple rounds of trade friction, with the comprehensive tariff rate reaching as high as 20%. The trade dispute between China and the U.S. has not only profoundly impacted the economic development of both countries but also had widespread and far-reaching effects on the global economic structure and the stability of industrial chains. With the advancement of economic globalization, the interdependence of global economies has increased, and trade links between countries have become increasingly close [1,2]. The international trade policy of one country affects not only its domestic economy but also exerts significant spillover effects on other countries, international organizations, and participants in global economic activities [3].

In the context of globalization, the U.S. tariff increase on China not only directly impacted Chinese exports and related industries but also led to higher domestic production and consumption prices in the U.S., lower product quality, and triggered a series of reactions, including reduced international trade, financial market volatility, and global economic downturn [4-6]. These effects have rippled through major economies involved in the global industrial and value chains, such as the European Union, Japan, and Russia, causing varying degrees of disruption to their economic operations and industrial stability. This illustrates that even bilateral or regional trade policies (e.g., China-U.S. trade tensions, regional trade agreements) have effects that extend beyond the specific regions involved, becoming key variables in the operation of the global economy [7,8].

In the increasingly complex international environment, accurately assessing the implementation outcomes of international

trade policies and their global impact is a critical academic and policy issue. This paper, based on public policy evaluation theory and policy informatics methods, uses global media data to develop an international trade policy evaluation model based on global public opinion. The study aims to assess the global impact of the China-U.S. trade friction by uncovering the differences in attitudes toward tariff policies across various economic entities (such as countries and institutions). This evaluation model provides scientific and practical insights for the formulation, assessment, and adjustment of China's international trade policies.

2. Data Sources and Model Construction

2.1 Data Sources

The Global Database of Events, Language, and Tone (GDELT) is a large-scale global dataset that collects and integrates detailed content from a variety of media and publications worldwide. One of the key features of this database is its high-frequency update mechanism, with data being updated every 15 minutes, providing near real-time information on global media reports. Each report in the GDELT database corresponds to a data record that includes multiple fields of information, such as: the publication time, the media outlet, sentiment index, the topic of the event or policy, and the countries, organizations, and individuals involved.

By utilizing GDELT data, it is possible to quantitatively analyze political, economic, and social events on a global scale from multiple dimensions. Particularly in the study of international trade policies, the GDELT database is effective in capturing global media reactions to specific policies or trade events, offering real-time insights into public opinion dynamics [9,10]. This information not only helps assess the short-term effects of policies but also aids in predicting their long-term trends and impacts. Specifically, the main data sources of the GDELT database include: mainstream global news agencies, social media, blogs, forums, publications, and other media platforms, covering a wide range of languages and regions. This enables GDELT to provide a broad global perspective, facilitating multinational and cross-cultural policy evaluations and international comparative studies.

2.2 Model Construction

To assess the effects of international trade policies and their global impact, this paper constructs a multidimensional evaluation model based on data from the GDELT database. The model primarily consists of three core modules: attention hotspots and public opinion tendencies analysis, high-frequency vocabulary analysis, and country-specific differences analysis. Each module employs various analytical methods and data processing techniques to help researchers comprehensively evaluate the actual impacts and public reactions to international trade policies.

2.2.1 Attention Hotspots and Public Opinion Tendencies

To capture the emotional attitudes of global media towards a particular policy or event, this paper employs sentiment analysis methods. Sentiment analysis uses natural language processing techniques to assess the emotional tendency of text, determining whether it conveys a positive, negative, or neutral sentiment. This method typically relies on predefined sentiment lexicons and models, where each word corresponds to a sentiment weight. By conducting sentiment analysis on a large volume of text, each report can be assigned a sentiment index, which usually ranges from -100 to 100, where 100 indicates a highly positive sentiment, -100 indicates a highly negative sentiment, and 0 indicates a neutral sentiment [11,12].

The basis for sentiment analysis is Osgood's three-dimensional space theory (the EPA model), which classifies the emotional attributes of words in natural language into three dimensions: Evaluation, Potency, and Activity. These dimensions correspond to the emotional attributes of good-bad, strong-weak, and active-passive, respectively. By analyzing the words in the text of reports, the overall emotional tendency of the media towards a particular event or policy can be determined. This paper uses this method to calculate and display the sentiment index of each report, thereby assessing the public's attitude toward international trade policies. The average sentiment index is the mean value of the sentiment of all related reports, with the specific calculation formula as follows:

$$\text{ArticleSentimentEvaluationIndex} = \frac{\sum \text{SingleArticleSentimentIndex}}{\text{Total Numberof Articles}} \quad (1)$$

2.2.2 High-Frequency Vocabulary Analysis

In analyzing the content of global media reports, high-frequency vocabulary analysis is an important tool for assessing policy impact in addition to examining the sentiment tendency of the reports. By conducting statistical analysis on the keywords mentioned in the GDELT data, researchers can gain insight into the focus of media coverage on a particular topic or event.

Firstly, this study extracts keywords and names (such as countries, organizations, individuals, etc.) from each report, categorizes, and aggregates these names. For instance, when analyzing international trade policies, relevant keywords may include "tariffs," "international trade agreements," "imports and exports," and so on. For each keyword, the frequency of its occurrence in all related reports is calculated to identify the most frequently mentioned countries, organizations, or events in global media coverage.

Subsequently, by visualizing these high-frequency words (e.g., through word clouds, frequency comparison charts, etc.), researchers can visually identify which countries, regions, or organizations dominate the media coverage. This analytical approach effectively reveals the focal points of global public opinion, helping researchers understand which factors have the greatest impact on the discussion of international trade policies. The higher the frequency of a high-frequency term, the stronger the media or public's attention to the related topic, reflecting the relative importance of specific countries, regions, or events on a global scale.

2.2.3 Country-Specific Difference Analysis

The GDELT database provides media coverage from across the globe but does not directly provide information on the publication location of each report. To address this limitation, this paper links the "Country of Publisher Table" with the GDELT data and determines the publication country by identifying the country of the media outlet that published the article. This method enables researchers to classify reports by country and analyze the differences in media reactions to the same international trade policy across different countries or regions.

This approach is particularly useful for assessing the differences in how various countries react to the same trade policy on a global scale. For example, one country may have a negative attitude toward China's trade policy, while another may adopt a more neutral or supportive stance. Through country-specific difference analysis, this paper reveals the varying sentiments and positions of governments, citizens, and other international organizations toward the same policy. This not only helps analyze the international dissemination effect of policies but also provides valuable reference information for the adjustment and formulation of international trade policies. The calculation formula for the average sentiment index by country is as follows:

$$\text{International Average Sentiment Index} = \frac{\sum \text{Single Article Sentiment Index}}{\text{Total Number of Articles}} \quad (2)$$

3. Discussion of Results

3.1 The Impact of Steel and Tariffs on Commodity Prices: A Key Focus of International Public Opinion

Based on the constructed "high-frequency vocabulary" model, this paper analyzes the keywords related to "tariffs" and their frequency of occurrence in global media, aiming to identify the key concerns of international public opinion through the monitoring of high-frequency vocabulary changes. This model, using the extensive global reporting data provided by GDELT 2.0 (established since 2015), enables researchers to capture real-time public opinion dynamics surrounding international events. The analysis particularly focuses on the differences between reports on the China-U.S. trade friction (2018) and routine data, with special attention to changes in high-frequency vocabulary related to the keyword "tariffs."

According to the data, from 2015 to the present, Table 1. displays the top 20 rankings of "tariff"-related terms, with prominent mentions of the United States, Trump, the United Kingdom, the White House, and the European

Union. Table 2. shows the high-frequency vocabulary and ranking changes of "tariff"-related terms during the China-U.S. trade friction period. Notably, terms such as "steel," "impact of tariffs on prices," and "national tariff commission" saw significant ranking increases, indicating that during this period, global media paid substantial attention to the relationship between tariffs and commodity prices.

Table 1. Regular Ranking of "Tariff" Related Terms (2015 to Present)

Ranking	Name	Ranking	Name
1	United States	11	North Korea
2	Donald Trump	12	World Trade Organization
3	United Kingdom	13	Supreme Court
4	White House	14	Future Analysis
5	European Union	15	Middle East
6	Tariff Act	16	South Africa
7	Saudi Arabia	17	Market Share
8	South Korea	18	Border Protection
9	New York	19	Sri Lanka
10	Prime Minister	20	Hong Kong

Through the analysis of high-frequency vocabulary changes, it is evident that the China-U.S. trade friction had a tremendous global impact, with public opinion largely focused on the effects of tariffs on commodity prices and the steel industry. For example, the tariff increase on Chinese goods not only led to rising prices for intermediate and consumer products in the U.S., but it also potentially affected product quality. Furthermore, steel, as one of the key commodities targeted by U.S. trade protectionism against China since the 1990s, experienced severe industry disruptions. By monitoring high-frequency vocabulary, it is possible to promptly identify the scope of the impacts brought about by trade policy implementation, allowing policymakers to assess which sectors are most affected and offering valuable insights for response strategies.

Table 2. Monitoring of Changes in Names Related to "Tariffs" during the Sino-US Trade Friction

Ranking	Name	Regular ranking	Ranking Changes
1	United States	1	0
2	Donald Trump	2	0
3	Steel	108	104
4	How tariffs affect prices	874	869
5	White House	4	-1
6	Annual sales figures	81	74
7	Prime Minister	10	3
8	South Korea	8	0
9	Dow Jones Industrial Average	102	93
10	United Kingdom	3	-7
11	Future analysis	14	3
12	European Commission	76	64
13	American Chemistry Council	1616	1603
14	Middle East	15	1
15	Independent market analysis	258	242
16	Federal government	22	5
17	State Council Tariff Committee	1796	1778
18	Free trade agreements	387	368
19	China Business Council	1493	1473

3.2 Differences in the Focus of International Trade Concerns across Different Linguistic (Cultural) Countries

Language is not only a tool for communication but also reflects the close relationship between

culture and geography. Countries that speak the same language often share similar historical backgrounds and political-economic ties. Therefore, this paper analyzes the differences in international trade public opinion from a cultural perspective by examining reports in different languages. Based on linguistic differences, the focus and areas of concern in the reports vary accordingly.

Chinese-language reports primarily originate from China and countries or regions heavily influenced by Chinese culture, such as Singapore, Thailand, and other Southeast Asian nations. Russian-language reports are concentrated in Russia and its neighboring countries, such as Belarus and Kazakhstan. English-language reports primarily come from Western countries, while Japanese and Korean-language reports focus on Japan, South Korea, and North Korea. According to public opinion analysis, Western countries and the Japan-Korea region particularly focus on the economic and trade situation of Hong Kong, reflecting the close political, economic, and trade ties between these countries and Hong Kong. Therefore, from the perspective of evaluating international trade policies, cultural circles or national groups with closer ties to Hong Kong tend to receive more attention in public opinion. This linguistic and cultural differentiation provides diverse perspectives in the assessment of the impact of global trade policies and helps policymakers better understand the multifaceted international responses.

3.3 Variations in Attention to Tariffs and Attitudes across Different Countries

As a tool for national economic regulation, tariffs have distinct "national characteristics." The differences in how much attention and what attitudes different countries give to tariffs reflect their economic interests, political positions, and trade relationships with other countries. This paper constructs a "country-specific difference" model to analyze the sentiment tendencies and levels of concern exhibited by various countries in their reports.

For instance, Hungary exhibits a clear negative attitude toward tariffs, with an average sentiment index for its articles being negative, and the number of negative reports significantly higher than in other countries. In contrast, countries like Turkey and Armenia, while having sentiment indices close to zero, have a larger number of articles involving "tariffs," showing that these countries pay considerable attention to the issue. Moreover, by analyzing the domain suffixes of various websites (e.g., .org, .gov), the paper further explores the differences in attitudes towards tariffs between social organizations, government bodies, and other institutions. The results show that government departments generally take a more positive stance on tariff policies, viewing tariffs not only as economic tools but also as political measures to safeguard national economic security. Social organizations and other institutions, on the other hand, focus more on the negative economic impacts of tariffs, such as their effects on free trade and commodity prices.

3.4 Trade Liberalization: A Universal Call from Most Countries and Societal Sectors

Globally, despite differences in national positions on tariffs, most countries and sectors of society generally advocate for trade liberalization, calling for tariff reductions and fewer trade barriers. Through sentiment analysis of tariff-related reports in the GDELT database, this paper further explores the attitudes of different countries and regions towards tariffs, particularly in the articles with the highest and lowest sentiment indices, examining the positions of various groups.

From the global sentiment trend in the reports, the United States' trade policy has sparked widespread controversy internationally. As the largest economy in the world, the U.S. has frequently initiated trade frictions in recent years, especially during the Trump administration, when tariffs were imposed on countries like China, Canada, and Mexico, becoming a focal point of global attention. While the Trump administration argued that tariffs could protect domestic manufacturing and economic security, the policy triggered strong opposition internationally. Many countries and domestic importers believed that such trade restrictions increased operational costs for businesses and could potentially lead to economic recession. Even within the U.S., some lawmakers openly opposed Trump's tariff policies, arguing that they imposed burdens on American consumers and businesses.

In contrast, some countries actively support tariff reductions and free trade. For example, New Zealand's wine industry expressed strong support for a tariff amendment, believing that it would facilitate the signing of a free trade agreement with South Korea, bringing greater market opportunities and profits. Similarly, Xinhua News reported that the implementation of a unified regional tariff code would promote trade facilitation and further reduce trade costs. These cases demonstrate that the universal call around the world is for trade liberalization, promoting global economic connectivity and prosperity by reducing tariffs and trade barriers. The international community hopes to foster the facilitation and efficiency of global trade through enhanced dialogue and cooperation, helping people benefit more directly from trade. Although the trade disputes initiated by the United States have sparked some negative sentiment globally, the international community generally believes that only through cooperation and policy coordination can long-term prosperity and sustainable development in global trade be achieved.

4. Conclusion

This study, through in-depth analysis of the Global Database of Events, Language, and Tone (GDELT), combined with sentiment indices, high-frequency vocabulary, and regional differences, employs big data analysis and empirical methods to explore the media coverage dynamics of international trade policies, especially trade disputes and tariffs. By monitoring sentiment tendencies and public opinion shifts in media reports across different languages and cultural contexts, this paper provides new perspectives and methods for studying the impact of international trade policies on global public opinion.

Firstly, through the constructed "high-frequency vocabulary" model, the paper analyzes the changes in global media attention towards the keyword "tariffs," revealing the profound impact of international trade disputes, such as the China-U.S. trade conflict, on the global public opinion landscape. Particularly, sentiment index analysis reflects the differences in attitudes towards tariff policies across countries and highlights the public opinion discrepancies between different cultures and nations when facing international trade policies. Detailed analysis of high-frequency vocabulary and regional differences shows that the trade disputes initiated by the U.S., especially the imposition of tariffs on China, have triggered widespread negative sentiment globally, which has spread to other economies and trade partners.

The study also finds that, despite differing national attitudes towards tariff policies, the promotion of trade liberalization and the reduction of trade barriers remain common calls among most countries and societal sectors. Through sentiment analysis of global media coverage, it is evident that countries affected by U.S. policies, as well as other regions worldwide, generally support reducing tariffs and promoting trade liberalization. This is particularly true for smaller economies and developing countries, where support for free trade and open markets is especially strong, as they view these as key avenues for economic growth, increased market share, and improved livelihoods.

Moreover, the indicators and analytical models in this study can effectively assess the level of attention and attitudes of different countries and cultural groups towards international trade policies, providing important decision-making support for future monitoring of international trade policies. These methods help policymakers identify global public opinion dynamics, detect potential public opinion risks in a timely manner, and provide data support and theoretical foundations for adjusting and formulating international trade policies. Especially in the context of complex international trade environments and political-economic negotiations, sentiment analysis can assist in better understanding international public opinion dynamics, enabling the formulation of more accurate and flexible diplomatic and trade strategies.

Finally, the study concludes that with the advancement of globalization, the formulation of international trade policies increasingly needs to consider global public opinion feedback and sentiment tendencies. In the context of increasingly complex shifts in global public opinion, countries should strengthen the monitoring and analysis of global public sentiment, emphasize transnational cooperation and dialogue, and reduce trade frictions through policy communication and interaction, thereby promoting the stability and sustained growth of

the global economy. Regarding trade liberalization, the overwhelming majority of countries and sectors worldwide hope to promote global economic development by reducing tariffs, eliminating trade barriers, and strengthening regional economic cooperation. Therefore, international trade policies should move towards more open, fair, and diversified directions to achieve the shared prosperity of the global economy.

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