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The Impact of Technical Barriers to Trade on China's Automobile Exports--Taking BYD as an Example

Luyao Wang

Shanghai University, Shanghai 200444, China

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Abstract: With the continuous economic integration and trade liberalization, tariff restrictions have been gradually replaced by some emerging non-tariff barriers. Due to their inherent characteristics of not being easily detected, technical barriers to trade are increasingly becoming a means of protection for some developed countries, which can cause some substantial restrictions on China's industrial exports. Due to their inherent characteristics of not being easily detected, technical barriers to trade are increasingly becoming a means of protection for some developed countries, which can cause some substantial restrictions on China's industrial exports. This paper introduces the impact of technical barriers to trade of China's automobile enterprises and combines the impact of technical barriers to trade with the impact of technical barriers to trade on China's automobile industry. This paper introduces the impact of technical barriers to trade of China's automobile enterprises and combines the case of BYD Auto breaking through the trade barriers to analyse that technical barriers to trade will hinder the export of automobile enterprises in the short term. export of automobile enterprises in the short term, but can promote the development of the industry in the long term, and proposes feasible measures for China's automobile enterprises in the face of technical barriers to trade.

1. Introduction

1.1. Background

With the continuous development of economic globalization, China, as a major trading country, is also developing quickly. Along with the continuous growth of China's trade volume, trade conflicts and frictions are also increasing rapidly. In the continuous development of countries in the process, some countries, in order to protect their dominant position in a certain field, will choose some of the more hidden non-tariff barriers in order to promote the development of the economy, other countries find that the means can be very good to promote the country's economic

development, and the easy to operate the implementation of the time will have to follow suit. At present, the new means of trade protection adopted by various countries are the technical barriers to trade, and because of the characteristics of the technical barriers to trade themselves, the role they play in the trade process has far exceeded that of other means, and has produced a serious obstruction to global economic and trade activities.

With the continuous development of China's automobile industry, exports are also increasing, in the international influence will also become increasingly, then inevitably will encounter trade problems with foreign countries. Such trade measures in the short term seriously impede the export of China's automobiles to Europe and the United States and other developed countries, in addition to the technical trade measures taken by the countries to protect their own national industry, the export of a greater restriction is also due to the quality of their own technical standards have not been met, and a lack of technical barriers to trade and understanding of the cognition and understanding. This paper analyzes the positive and negative impacts of technical barriers to trade on China's automobile exports through the study of the content characteristics of technical barriers to trade, through the analysis of BYD automobile breakthroughs in the process of technical barriers to trade of technical barriers to trade will be hindered in the short term in our country, but the long term will make a breakthrough in China's technological development, and put forward proposals to make China's automobile exports encountered when the technical barriers to trade in a timely manner to solve the problem, to further expand global sales. The solution, to further expand global sales.

1.2. Literature review

For the impact of technical trade barriers to enterprises, domestic and foreign researchers have different understandings. Li Zhi (2016) concluded that the U.S. technical barriers to trade deteriorated the environment of international trade, causing a greater negative impact on China's export trade [1]. Tang Ruoming and Li Cong (2018) pointed out that under the influence of technical trade barriers due to the enterprises have to raise the cost, resulting in rising pressure [5].Bianco et al. (2015) studied the impact of section technical trade barriers on red wine exports and found that most of the technical trade barriers have a negative impact on exports [2]. Xu Wei, Bu Hai (2018) conclude that the reverse mechanism of trade barriers export trade plays a facilitating role [3]. Qiu Yangying (2019) and others pointed out that trade barriers will have a bad impact on trade exports in the short term, but the long term will indirectly improve the relevant technological capabilities of the exporting country [6]. Zhang Zhaozhong and Wang Lei (2020) argued that the technical barriers to trade bring about the improvement of technical standards, is not just purely out of local protectionism, and that it has a positive effect on the exporting countries that are relatively technologically disadvantaged to promote technological innovation [7]. Meng Shengru and Pan Haisheng (2020) believe that moderate technical barriers to trade can create a favorable trade environment and balance the interests of trade, but once excessive, they will hinder the international trade market [4].

In response to how to deal with technical barriers to trade measures, Dong Binchang (2017) and others, by discussing the impact of technical barriers to trade on bilateral trade between China and Japan at the governmental level, suggest that the WTO rules should be actively used to protect and establish an early warning mechanism; and at the industry level, the functions of industry associations should be clarified, and the constraints of the industry associations should be strengthened [8]. Harmon Ioanne (2019) and others, in their discussion of the WTO rules on technical barriers to trade proposed that if you want to cross-border trade barriers must strengthen the national relevant aspects of institutional construction, and constantly improve the level of

technology [9]. Ma Tianyue (2020), based on the perspective of the global value chain, explored the impact mechanism of trade barriers on China's self-protection innovation, and suggested that the innovation main body status of enterprises should be adhered to [10].

2. Theories related to Technical Barriers to Trade

2.1. Technical Barriers to Trade

When economic globalization drives countries to lower tariff barriers and establish free trade zones, new trade protection means represented by technical barriers to trade come into being. The definition of technical barriers to trade is more uniformly recognized from the "Agreement on Technical Barriers to Trade" summarized, which mainly referring to "a government or non-governmental organization to safeguard national security, safeguard human health and safety, protection of the ecological environment, the protection of product quality and safety, etc., to take mandatory or voluntary technical trade measures in laws and regulations, these measures have become the basis of national security, human health and safety, protection of the ecological environment, protection of product quality and safety. Trade measures in the regulations, these measures become other countries' goods and services into the country's market obstacles."

2.2. Characteristics of Technical Barriers to Trade

2.2.1. Concealment

Based on their advanced development process, developed countries set access standards higher than the world average, which are relatively backward in terms of their level of scientific and technological development, to adapt. This approach is not directly discriminatory on the surface, but in order to obtain market access, manufacturers in developing countries are forced to improve their production technology, adjust their raw materials, increase their production costs and reduce the competitiveness of their products.

2.2.2. Bilateral

On the one hand, the adoption of technical measures in a reasonable and lawful manner can play a role in promoting the environment security and economic development within each country, and the products can better meet the needs of consumers and safeguard their rights and interests. On the other hand, the use of negative technical barriers to trade in the name of a protecting country hinders the friendly exchange of trade among countries, and it is difficult for the developing countries to meet the strict technical standards of the developed countries when the developed countries are in control of high and new technologies.

2.2.3. Flexibility

Because of the uncertainty and plasticity of TBT measures, it is only necessary to change the standards or increase the level of standards for commodities in order to exclude imported commodities. Moreover, TBT measures are based on technical standards at a high level of technology, which is difficult for developing countries to judge if they do not have a high level of technology.

3. Impact of technical trade barriers on China's automobile exports

3.1. Negative Impact of Technical Trade Barriers on China's Automobile Exports

3.1.1. Short-term Hindrance to China's Foreign Exports if Automobiles

Due to the influence of technical barriers and the limitations of Chinese enterprises themselves, it is difficult to meet the technical standards of developed countries in a short time. Moreover, in order to protect their own car enterprises from competition, developed countries are also constantly raising the relevant standards, further restricting the exports of Chinese car enterprises and forcing Chinese enterprises to prefer selling to developing countries.

3.1.2. Increased Export Costs and Reduced Competitiveness

As technical standards continue to rise, the R&D investment and technical costs of Chinese automobile production will also rise, which will lead to a significant decrease in the profitability of automobiles at the sales stage. In order to meet the technical standards of developed countries, the domestic automotive industry hires highly paid researchers to upgrade its technology and spends a lot of money to be certified by certification organizations in different countries.

3.1.3. Impact on the Normal Operation of the Market

Technical barriers to trade will have an impact on the operating order of the market, it is difficult for enterprises to grasp the impact of the measure and the direction of the market in the later stage, so enterprises will make adjustments to overall product planning, due to the psychology of avoidance and inhibit the development of enterprises.

3.2. Positive Impact of Technical Trade Barriers on China's Automobile Exports

3.2.1. Optimization of Industrial Structure

Domestic automobile enterprises must enter foreign markets if they want to expand their market share. Due to the existence of high technical barriers to trade in Europe and the United States, it is particularly important to improve the level of productivity and increase the efforts of industrial restructuring. China's automobiles will be upgraded to the industrial structure, with the technical standards of developed countries, require their own production tends to stabilize.

3.2.2. Raising Awareness of Technical Regulations and Standards

Technical barriers to trade have enhanced our understanding of technical standards and technical regulations, which is conducive to the formulation of relevant rules and standards in China [11] In addition to solving the problem with the help of the State, enterprises can also submit their opinions to the World Trade Organization, and they should be more based on their own countries to promote the formulation and implementation of technical regulations and standards.

3.2.3. Promoting Technological Innovation

By setting higher technical standards, in the short term, it will limit the export trade of the less technologically developed countries, but in the long term, in order to broaden their global marketing volume, enterprises will promote technological innovation, technology application and

technological transformation. This fundamentally improves China's automobile enterprises' independent innovation ability, plans its own development direction, and continuously accumulates capital and technology to improve the international influence ability [12].

4. The Impact of Technical Trade Barriers on China's Automobile Exports--Taking BYD Auto as an Example

4.1. Introduction of BYD

BYD was founded in 1995, initially mainly engaged in the manufacture of electronic products; BYD successfully listed on the Hong Kong Stock Exchange in 2003, and with the acquisition of Qinchuan Company based on the establishment of BYD Automobile, formally entered the automobile market. In 2003, BYD was successfully listed on the Hong Kong Stock Exchange and established BYD Auto based on the acquisition of Qinchuan Company. In 2008, BYD launched its first plug-in hybrid car, opening its own new energy automobile business. In 2012, BYD attracted a large number of customers through the technological innovation by comprehensively upgrading the configuration of the electronic system of the electric car. In 2014, the clean energy automobiles in the country got a rapid development, BYD grasped this opportunity in the production and sales of new energy vehicles in the domestic leading position. 2015 to 2017, BYD company, as the world's largest sales of the system of energy automobile manufacturers, but also has the whole industry chain of new energy vehicles, which is considered by the market as China's new energy automobile leading enterprise. In 2018, BYD continued to play the power battery research and development and production cost advantage. In 2020, in the face of the epidemic, BYD's automobile business stagnated, but with the support of various policies, BYD's automobile business will grow again in 2021.

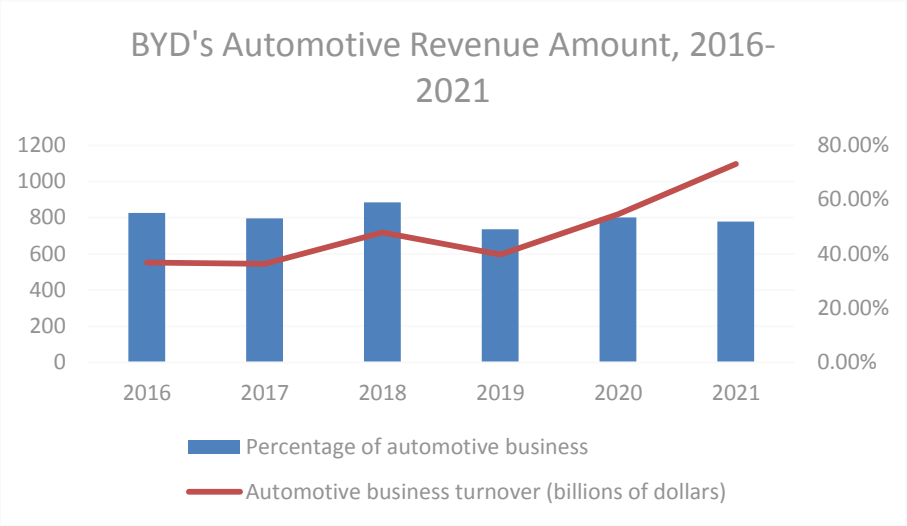

Figure 1. BYD's Automotive Revenue Amount, 2016-2021

BYD's turnover performance in the global market has evolved in recent years. BYD's annual turnover in 2016 was 100.2 billion yuan, mainly from domestic sales, and its international receivables accounted for only 8%. In 2020, BYD's foreign turnover reached a new high, accounting for 38.52% of BYD's global turnover. In 2021, although the share of foreign revenue declined, the overall global turnover increased significantly, and the sales of BYD vehicles outside of the country continued to be in good condition. As shown in Figures 4-2, BYD's offshore turnover amount grows more significantly from 2016 to 2021, and BYD's sales outside the country still

double in 2020 due to the impact of the epidemic. Comparing the proportion of overseas operating income from 2016 to 2021, it can be seen that BYD has been working hard and achieved very good results on the way to enter the international market.

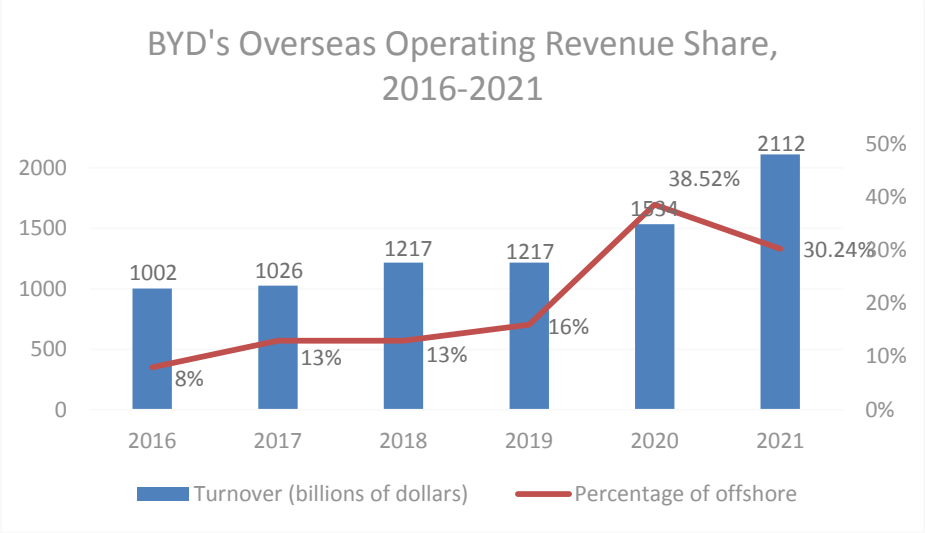

Figure 2. BYD Auto Overseas Operating Income Amount, 2016-2021

4.2. The Role of Technical Barriers to Trade for BYD

Because of the hidden nature and extensive complexity of trade barriers, exports are easily hindered by technical barriers to trade with other countries. Besides, BYD is not fully aware of the relevant systems and technical standards involved in foreign technical barriers to trade automobile as a high consumption of perishable goods in the export will need to carry out market access and mandatory certification [13]. Because there are differences in international standards and regulations, the use of unreasonable technology and set up complex certification procedures, restrictions on the export of products. BYD new energy vehicle itself exists in part in the technical immaturity of the shortcomings in the complex technical issues involved, it is difficult to export a large number of countries and regions with more stringent technical programs, exports are also more susceptible to the impact of technical barriers to trade.

As the earliest market to adopt technical barriers to trade, the European Union (EU) has always drawn reference to its technical standards and regulations, so the international technical standards and regulations related to new energy vehicles refer more to European and American standards. As the region with the highest proportion of new energy vehicles and the leader of low-carbon economy, the EU has set up strict regulations and certification systems for the entry of imported vehicles, requiring that the vehicles of enterprises entering the EU region have to obtain the "EU Vehicle Approval" mandatory. 2011 BYD's purely electric buses were firstly introduced to the world's largest bus exhibition, and now they have been introduced to the world's largest bus exhibition. In 2011, BYD's pure electric bus was first announced in Busworld, the world's largest bus exhibition, and two years later, BYD's pure electric bus K9 appeared on the streets of London. During these two years, BYD broke through its technical bottleneck, transformed the charging method according to European standards, developed long-range batteries, and improved and optimized product quality, and ultimately passed the EU vehicle type certification's 25 vehicle evaluation items and dozens of individual product certifications, including steering, noise, and noise. Finally, BYD has passed 25 vehicle assessment items and dozens of individual product certifications of EU vehicle type certification, including steering, noise, and bus structure. Since

London, BYD has conquered other UK cities such as Liverpool and Nottingham. Since 2017, the UK market has all been won by BYD. This marks BYD's successful entry into the European market, driving the development of new energy vehicles in the country.

In addition to the EU certification, BYD has also passed the U.S. certification. As we all know, the U.S. is a region with high technical barriers to trade, and its automobile regulations mainly include the "Vehicle Safety Act" and the "Environmental Protection Act", which set up stringent review measures in terms of automobile's safety performance, noise, and pollutant emissions, etc. BYD's K9 buses have successfully operated in the U.S. market. After the successful operation of BYD's K9 bus, BYD officially entered the U.S. market. Through its own technical level and product characteristics, on May 23, 2012, BYD obtained 5 certificates including UL certification for new energy vehicle chargers from UL Certification, a third-party safety certification organization. In May 2013, BYD sold 25 of its pure electric buses to the Los Angeles County Metropolitan Transit Authority (MTA), and on June 9, 2014, BYD's K9 became the first 12-meter pure electric bus to complete the "Altoona Test". This cleared the legal hurdles for BYD to obtain orders in the U.S. and secured an order for 60 pure electric buses, setting a record for the largest pure electric bus order in the U.S. In October 2017, BYD's electric bus plant in Lancaster, California, was completed and put into production. This is the first wholly owned Chinese bus plant in the U.S. and the largest electric bus plant in North America. In October 2017, BYD's electric bus plant (Phase III) in Lancaster, California, was fully completed and put into production. This is the first wholly owned Chinese bus plant in the United States and the largest electric bus plant in North America.

As can be seen from BYD's experience of passing the world's two most difficult certification systems, technical trade barriers invariably drive BYD's continuous upgrading and innovation of its automobiles, overhauling the structure of the automobile and upgrading the standard of its products. This is also the key to BYD's success in entering the international market. BYD has been adhering to its mission "to meet people's aspirations for a better life with technological innovation", increasing investment in research and development, focusing on the introduction of talent and gathering to promote the continuous development and expansion of the R & D team. 2020 In the face of the epidemic and the United States of America's sanctions on China's chip, the domestic automobile chip appeared with a large number of shortages, this is because China's automobile enterprises have to upgrade the automobile structure, rectify the standard of products. Shortage, this is because China's automotive enterprises rely on import of advanced chips by 95%, the domestic market due to the lack of core technology and vehicle-grade chip R&D cycle is long and other characteristics of very few chip companies to carry out research and production, foreign manufacturers monopolize the chip in China. BYD from 2002 in the semiconductor field in the continuous break the monopoly of foreign enterprises, after 20 years of efforts in the MCU sensors to achieve significant research results, in the IGBT chip also has a complete set of industry chain. In the future, BYD will continue to adhere to the concept of technological innovation combined with its own advantages to lead the high-quality development of new energy vehicles.

5. Conclusions

Comprehensive analysis of the above theories and cases, I believe that technical barriers to trade will, to a certain extent, limit the number of China's automobile exports, reduce the competitiveness of China's automobiles in the international market, but in the long run, the technical barriers to trade to promote the development of enterprises and thus enhance the export volume of China's automobile industry. China's independent automobile enterprise to break through the technical barriers set up by other countries, it is bound to pay more attention to the above aspects of performance enhancement.

5.1. Establishment of a Testing Mechanism to Keep Abreast of Information on Technical Barriers to Trade

In most cases, technical barriers to trade impede the export plans of enterprises, often because they do not pay attention to international information in a timely manner, information asymmetry. The establishment of a detection mechanism to play the role of information collection, analysis, transmission, and accurate grasp of international information. At the same time, we do a good job in dealing with technical barriers to trade coordination mechanism, emergency response, etc., to reduce the sudden technical barriers to trade on China's automobile enterprises caused by the short-term impact.

5.2. Actively Cooperating with Foreign Companies and Setting up Factories Abroad to Cross Trade Barriers

Domestic automobile enterprises can cooperate with foreign automobile enterprises, utilize the brand effect of foreign enterprises to attract foreign investment in cooperation projects related to automobile research and development, production and processing, and cooperate and compete with foreign enterprises, to achieve the purpose of mutual benefit and win-win situation. In addition, China's automobile enterprises can bypass technical barriers to trade through cross-border mergers and acquisitions or direct acquisitions of foreign enterprises to develop an internationalized business strategy and promote the export of domestic automobiles.

5.3. Continuously Promoting the Technological Innovation of Enterprises

Automobile research and development itself has a long cycle, high risk characteristic, only to improve their own level of science and technology to truly overcome technical barriers to trade. Therefore, it is important to increase the research and development of automobile products and strengthen technological innovation. Mastery of research and development of the core technology is the enterprise to obtain sustainable development and break through technical barriers to trade the fundamental way.

5.4. The Government should Actively Guide and Increase Investment in R&D to Create a Stable Market Environment

The government should formulate relevant policies to subsidize the R&D activities of automobile enterprises in order to reduce the financial pressure of enterprises in the R&D process; improve the tax incentives for automobile enterprises to purchase large-scale equipment to give appropriate value-added tax concessions. Through multi-pronged measures to guide the automobile industry, to create good market conditions for enterprises so that car companies focus on the core technology with independent consciousness.

Funding

If any, it should be placed before the reference section without numbering.

Data Availability

The datasets used during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

The author states that this article has no conflict of interest.

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