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The Explanatory Study of China's Iron and Steel Industry Competitiveness in The Developmental State Theory

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ABSTRACT

The low technological and energy efficiency of China's iron and steel industry is not directly correspond with the competitiveness of its products in both domestic and international markets. This study aims to explain the anomaly of the high competitiveness of China's iron and steel industry despite its low production efficiency. Using developmental state theory and qualitative methods, it was found that the Chinese Government sets the direction of development and increasing the competitiveness of its iron and steel industry in every five-year development plan. The government also affects the supply side with protection policies. To compensate the production inefficiencies, the Chinese government provides direct, and indirect, also structural subsidies. On the demand side, the government makes stimulus projects and opens foreign markets through regional free trade agreements that make high economies of scale which decreasing production cost.

Keyword:
Competitiveness, Inefficiency, Iron and steel industry, Developmental State.

INTRODUCTION

China's modern iron and steel industry dates back to the rise of the Chinese Communist Party in 1949. This industry was designed to support a development model that emphasized heavy industry as embraced by Stalinist countries generally. As an infant industry and with technological limitations, in that year China could only produce 158,000 tons per year. Considering the very high demand for iron and steel, in order to increase the quantity of production in 1958 Mao Zedong through his Great Leap Forward Program instructed that each village and city have its own iron and steel industry or known as the "backyard blast furlance" model. The model could in fact increase China's iron and steel production to 5.3 million tons per year, but with a scattered, small industrial pattern and using simple technology, the model eventually ends up with inefficiencies and low quality of iron and steel (Hakim, 2011, p. 25).

Along with economic reforms and China's entry into the free trade system by

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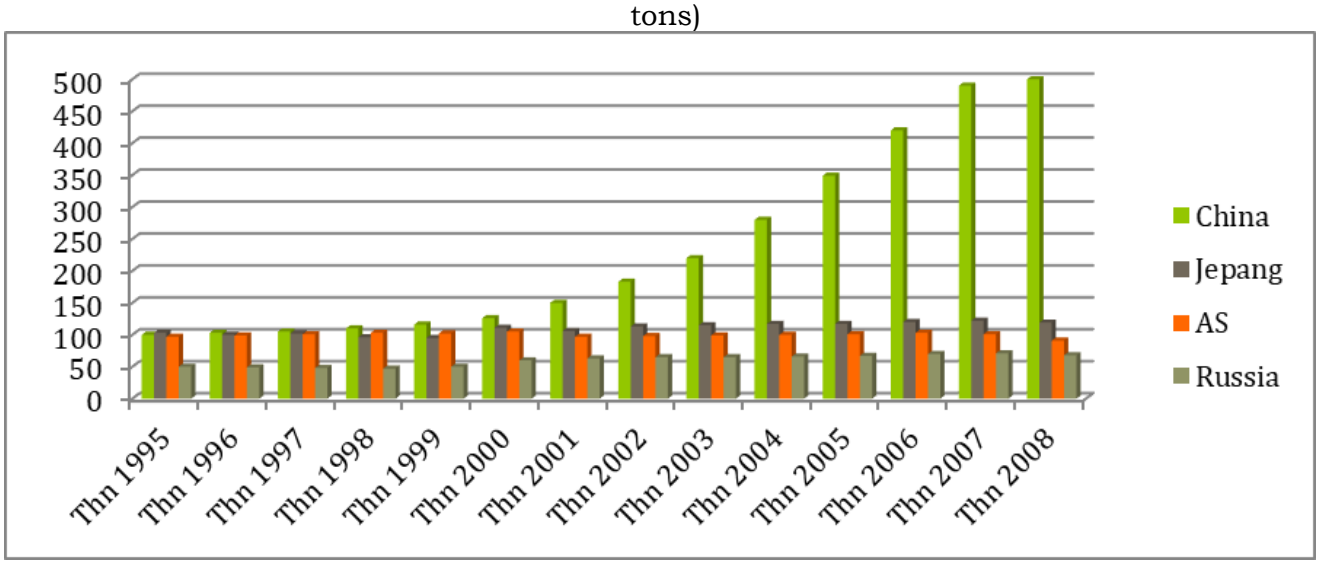
its participation in the WTO in 2001, China began to realize that its dispersed, small and inefficient model of iron and steel industry would not be able to compete in the free trade, therefore, the Chinese government changed its iron and steel industry development model from "backyard blast furnace" to a centralized and integrated industry (Hakim, 2011, p. 25).

The change in the model of iron and steel industry development which carried out by the Chinese Government finally brought very impressive results. In 2000 China could only produce 126 million tons and was ranked as the world's fourth-largest steel producer, but in 2005 this Beijing emerged as the world's largest producer with a production of 348 million tons, an increase of 175 percent in just five years. Three years later, in 2008, China further latched on from its rivals, producing 500.3 million metric tons or 38% of the world's total iron and steel production, surpassing the total production of the three largest producing countries such as, Japan 118 MMT, Russia 68.5 MMT and the United States 91.4 MMT (Hakim, 2011, p. 26).

Graph 1. The Development of the World's Largest Iron and Steel Producer (In million metric tons)



Source: Congress Research Service.

Although the use of modern technology and a large domestic market have been able driving the output growth of China's iron and steel industry very impressively, the annual productivity level is only 7.96 percent due to low energy efficiency at 61.1 percent (He et al., 2013, p. 204). Under these conditions, China's iron and steel industry has even recorded increasingly remarkable output growth as shown in Table 1. In 2009 Baosteel, China's largest producer, still occupies the number 2 position of the world's top iron and steel producers and only three Chinese companies are in the world's top 10 producers, meanwhile in 2024 Baosteel occupies the first position with total production more than double of its close competitor ArcelorMittal of Luxembourg, and six of the world's top 10 producers are filled by Chinese iron and steel companies. In addition, since 2005 China has emerged as an exporter of iron and steel with a total of 43 million metric tons and the largest since 2016 until 2024 with a total of 117.1 million tons (Fojtíková, 2017, p. 18; World Steel Association, 2025).

Table 1. Top 10 Iron and Steel Companies of the World (In million metric tons)

Rank	2009	Country	Production	2024	Country	Production
1	ArcelorMittal	Luxembourg	77,5	Baosteel	Chinese	130
2	Baosteel	Chinese	31,7	ArcelorMittal	Luxembourg	65,0
3	POSCO	Carousel	31,1	Ansteel	Chinese	59,5
4	Nippon Steel	Japan	26,5	Nippon Steel	Japan	43,6
5	JFE Steel	Japan	25,8	HBIS	Chinese	42,2
6	Jiangsu	Chinese	20,5	Shagang	Chinese	40,2
7	Tata Steel	India	20,5	Jianlong	Chinese	39,3
8	Ansteel	Chinese	20,1	POSCO	Carousel	37,7
9	Severstal	Russia	16,7	Shougang	Chinese	31,5
10	Evraz	English	15,3	Tata Steel	India	31,0

Departing from the anomaly of increasing output and exports of the Chinese iron and steel industry which is very extraordinary in the midst of low energy efficiency and productivity. Previous study about China's steel industry competitiveness was measuring the comparative Advantage Index using econometric model (Fojtíková, 2017, p. 17). This study aims to explain why the Chinese iron and steel industry remains competitive in the sense of total production, and export, also the number of Chinese world top companies by using economic development model especially the role of state variable.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The developmental state model assumes that economic development is the main function of the state so that the state through its bureaucracy must be active in leading and intervening in the process to create industrial competitiveness which compatible with market mechanis (Johnson, 1982, pp. 26–305). In this context, development is seen as a unity of perspective that the state's priority is to pursue growth, productivity, and economic competitiveness, therefore the conflicts of idea about how to realize equality and social welfare must be avoided (Onis, 1991, p. 111).

The developmental state which commonly exercise by East Asia countries is characterized by government control over a variety of things that are critical to economic success; capital extraction; designing and implementing long-term national economic plans; manipulating private access to scarce resources; setting prices for different economic actors; coordinating individual corporate efforts; targeting specific industrial projects; resisting political pressure from forces of the times such as consumers or labor organizations; limiting the domestic economy from massive penetration of foreign capital, and more importantly carrying out projects to improve productivity, technological sophistication, and world market dominance (Winanti, 2003, p. 113; Woo-Cumings, 1999, p. 139).

This model has two stages: first, inward looking with the import substitution industrial strategy formalized by dependency theory, and is the initial phase of the developmental state. Second, the outward looking phase or export orientation after the infant industry is ready to compete in the international market and continuously increase the competitiveness of its industry (Hakim et al., 2024, p. 57).

The developmental state outward looking model was developed by Chalmers Johnson to abstract the success of Japan's economic development policies with an

average GNP growth of 11 percent per year as well as its dominance of world trade from 2 percent to 8 percent since 1952 to 1973 (Woo-Cumings, 1999, p. 147). Although it posits a large role of the state like the inward-looking model, what distinguishes this model is the orientation of its capital accumulation through export markets or integrated with international economies, especially center countries that have large market sizes. The economic logic of this model is that government intervention through protection and subsidies that distort the market price "relative price" stimulates economic activities towards the government's economic development plan (Amsden, 1989, p. 8).

From literatures above, this article sharpening the developmental state theory into some hypotheses, which are: Chinese government sets the direction of development and increases the competitiveness of its iron and steel industry in the development plan. The government affects the sides Supply with a protection policy. The Chinese government provides direct, indirect, and structural subsidies to compensate production inefficiencies. From the side Demand, the government makes stimulus projects and opens up foreign markets through regional free trade agreements that allow for economies of scale.

RESEARCH METHODS

This study uses explanatory qualitative methods. Qualitative is a procedure for collecting data in the form of narrative data. Explanatory is a problem-solving procedure that providing a causal relationship between variables (Nawawi, 2005, p. 63). In this study, the primary data were obtained from official report such China' five years development plan, World Steel Association, South East Asia Iron and Steel Association. The secondary data were sourced from books, articles, magazines, journals and newspapers as well as internet pages. All of data were collected through literature research by searching, collecting and discussing information contained in materials related to the theme. Data analysis is carried out by verifying, sorting, and classifying the data, then describing it to answer research questions.

DISCUSSION

Developmental State Model of China's Iron and Steel Industry

The developmental state is characterized by the active role of the government in economic development. In the context of China's iron and steel industry, both the central and local governments are actively involved in intervening to increase competitiveness given the weak productivity and energy efficiency. These interventions can be grouped into industrial planning, protection policies to affect the supply side, production efficiency side through direct, indirect subsidies, and structural subsidies, also affecting the demand or supply side through stimulus packages and the opening of foreign markets by regional free trade agreements.

Industrial development planning

In the model developmental state, Industrial development planning is carried out by the government in five-year stages that contain targets to increase industrial competitiveness. China's post-1958 Leap Forward economic development plan was under the economic reforms by Deng Xiaoping in 1978 which contained the Four Plans for Modernizing Economic Development (Hinton, 1986, p. v). As announced by the Ministry of Metallurgical Industry, the Chinese Government will import technology from abroad to increase national iron and steel production and be able to produce various types of iron and steel products (Hinton, 1986, p. v). Although in 2005, China was able to meet its domestic iron and steel needs and become an exporting country, but because it still felt the need to improve its production efficiency and upgrade technology for high-quality steel products, the Five-Year Development Plan 2011-2015 containing targets in the form of energy efficiency reaching 16 percent, reducing emissions by 17 percent, reducing water use by 30 percent (KPMG China, 2011, p. 1).

Supply-side restrictions through protection policies

In addition to determining the direction of increasing the competitiveness of the iron and steel industry, and considering the low efficiency and productivity of the industry, the government carries out a protection policy of imposing a tarrif of 8.8 percent for every iron and steel imported from abroad. For restrictions on foreign investment, it can be seen from Article 23 of the Chinese Government's Steel Policy, which prohibits foreign majority ownership in the domestic steel industry. "For any foreign investment in the iron and steel industry of China, foreign investor is not allowed to have a controlling share" (Hakim, 2011, p. 38).

Subsidies to offset inefficiencies

Subsidies are budget assistance by the government to compensate for low efficiency so that the prices of Chinese iron and steel products can compete in the domestic and international markets. These subsidies can be grouped into direct subsidies and indirect subsidies, as well as structural subsidies. Direct subsidies are an aid to the item of production input costs that aims to reduce production costs to compensate for the low efficiency of industry, indirect subsidies are financial facility assistance, while structural subsidies are efficiency obtained as a consequence of the government's macroeconomic policies. The forms of direct subsidies provided by the Chinese Government are as follows:

The iron and steel industry are a very intensive industry with raw materials, so the access (availability and price) of iron ore as the main raw material, greatly affects the competitiveness of the industry in this sector. In the case of China, although the country is the world's main producer of iron and steel, but it has a very high dependence on raw materials from abroad. In 2005 to produce 348 million metric tons of iron and steel, China imported about 79% or 275 MMT of iron ore from Australia, Brazil and India. This condition can be interpreted that the crisis and the increase in raw material prices will greatly affect the competitiveness of China's iron and steel industry. To anticipate that this will not happen, the Chinese government intervenes in the raw material market through import and export controls on iron ore and steel scrap, subsidies for companies exploring raw materials abroad, and cap prices.

In terms of restricting raw material exports, the Chinese Government has two objectives that benefit the Chinese steel industry and harm the steel industry of its trading partners. First, export restrictions keep the price of domestic raw materials cheap because demand from abroad can be suppressed, second, the price of raw materials abroad becomes expensive due to the limited supply of raw materials. This policy is shown by the restriction of coke exports, which is very important in the production process of traditional fission steel: in 2005 the Chinese Government gave an export quota for coke of only 14.3 million metric tons, even though the national production was 208 MMT. As a result, the price of coke in the Chinese domestic market is only US$ 139 per metric ton, while in foreign markets the price has jumped to US$ 220 per metric ton (Hakim, 2011, p. 31).

Furthermore, the Chinese Government also provides subsidies for steel companies that mine raw materials overseas, such as the subsidy given by the government to Jiangsu Sha Steel Group of RMB 1.3 million for its iron ore mining project in Australia. In addition, the government also provides raw materials and other production inputs for free or below market prices, such as the cost of water for production is only charged US$ 0.16 per cubic meter compared to US$ 2.50 in the United States (Hakim, 2011, p. 32).

The intervention policy on raw material prices by the Minister of Trade above is also followed up by the Economic and Trade Commission of each province to reduce iron ore prices in the form of import price limits. In Jingsu Province, for example, the Economic and Trade Commission issued an order to the Jingsu Port Authority not to process applications for iron ore imports from Australia or Brazil if the price is higher than US$54/ton for Australia and US$70/ton for Brazil (Hakim, 2011, p. 31).

In addition to raw materials, the production cost of the iron and steel industry is also affected by energy prices considering the constraint of 35 percent (Dai & Song, 2012, p. 162). Because the

energy efficiency of China's iron and steel industry is still 40 percent below that of developed economies, the Chinese government has been providing very cheap energy subsidies to the industry since 2000. The Alliance for American Manufacturing (AAM) reports that China's iron and steel industry has received $27 billion in energy subsidies from its government. In March 2006 at a steel business meeting at the headquarters of the Beijing steel company, Shougang Steel received assistance in supplying coal and iron ore for production from the Shanxi Provincial Government, on the condition that Shougang help restructure the steel industry in the province (Haley, 2007).

Workers' salaries as production costs also greatly determine production costs. In China, workers' right to organize independently as a channel to convey their welfare demands is not granted by the Government, except through the Communist Party Workplace which is within the organizational structure of the Chinese Communist Party. Demonstrations demanding workers' welfare have also received repressive measures from the government, such as the workers' protests at the Chongiqing Steel Plan that left two workers dead and dozens more injured. The absence of room for workers to demand welfare such as health insurance and occupational safety seems to be deliberately designed to reduce the company's expenses thereby lowering its production cost input (World Socialist Web Site, 2005).

Indirect subsidies

Indirect subsidies are mostly work to reduce the industry financial burden. The assistance provided by the Chinese Government is spread from production capacity development, merger processes without market mechanisms, financial restructuring, debt write-off, land rental assistance, credit priority, and tax relief. As revealed by AIST in The Money for Metal Report, since 2000 the Chinese government has subsidized US$ 52 billion, of which 6 billion to develop and transform the capacity of its steel industry so as to increase production by 170 percent between 2000 and 2005. This policy continued in 2004 with a disbursement of RMB 1.6 billion. Although this assistance was recognized by China as a violation of WTO provisions, until 2005 the assistance had not been stopped (AIST, 2007).

In order to strengthen the production capacity and efficiency of its steel companies, the Chinese government merged several companies without a market mechanism. January 2005 Wuhan Iron and Steel acquired a 51% stake in Ercheng Iron and Steel which has a production capacity of 3 million metric tons and a profit of RMB 20 million per year in 2004. This acquisition process ran without any purchase of Ercheng shares from Wuhan but only through a government decision (AIST, 2007).

The Debt-to-equity swaps policy is used by the Chinese Government to restructure the financial balance sheets of companies involved in debt with State-Owned Banks with subsidies of up to US$ 18.6 billion. Since 2000, 37% of Chinese iron and steel companies have leveraged $8.4 billion in D-T-E Swaps as part of the restructuring and consolidation program of state-owned steel companies. This policy is carried out by means of Non-Performing Loans of government steel companies transferred from Government-Owned Banks to State-Owned Bank Management Asset Companies (BAMCs) and then exchanged the debt into the dependents of BAMCs. The OECD reported that the convoluted transaction was an attempt to reduce debt secretly. In its report, the OECD said that Shanghai Baosteel, Anshan Steel and Xingang Steel have used these facilities to restructure their financial positions. A small steel company in Hunan Province, Valian Lianyuan Steel Corp has also used the facility worth RMB 740 million for restructuring (AIST, 2007).

Based on a report from Standard & Poor's, it is estimated that 40% or US$ 800 billion of loans disbursed by Chinese state-owned banks in leading industrial sectors, including the steel industry, have bad loans or defaults by debtors. To avoid a liquidity crisis in state-owned banks due to bad loans, the Chinese government also injected these state-owned banks. In 2003, the government injected the Bank of China and the China Construction Bank with US$ 45 billion. From 1998 until now, the

government has spent US$ 250 billion (AIST, 2007).

There is a significant difference in looking at land rental costs between Chinese and U.S. companies. In the United States, land is privately owned so the cost of renting land is left to the market mechanism, while in China the land is controlled by the state, so Chinese steel companies enjoy the benefits of land lease assistance from their government. The findings of an investigation by the Canadian government, as its trading partner, stated that Chinese steel companies located in the Special Economic Area received long-term land lease assistance from the government, such as Shanghai Baosteel, which is China's largest steel company, has obtained this facility worth US$ 200,000. AIST reports that China's iron and steel industry has received a $5 billion land lease subsidy from its government (AIST, 2007).

The Chinese Government is also prioritizing lending to its iron and steel companies. The Chinese banking system is dominated by 4 state-owned banks consisting of The Industrial & Commercial Bank of China, Bank of China, The China Construction Bank, The Agricultural Bank of China which control 60% of the total national credit, disbursing credit refer to the direction of the Central and Regional Governments based on the government's favorite companies such as steel companies. This is shown by the fact that 65% of loans from these banks are disbursed to priority industries, even though these industries account for only 25% of China's GDP (Hakim, 2011, p. 35).

China's tax policy provides incentives for mainstay industries, such as steel. In article 6 of China's Steel Policy, it is specifically stated that the government supports the iron and steel industry in the form of tax refunds. This tax incentive applies to 30 types of Chinese iron and steel products by obtaining exemptions from consumer tax and import tax on production equipment. Then the Chinese government also provided a reduction in export tax on flat steel products by 5% and a tax rebate of 13% (Hakim, 2011, p. 35).

Structural Subsidies.

Structural subsidies are the efficiencies which obtained as the consequence of the Government's macroeconomic policies and the leniency granted by the Chinese Government in environmental standards. In this context, the subsidy that most encourages the competitiveness of Chinese iron and steel is the exchange rate of the Yuan which is too low against the United States Dollar. The Chinese government has set the Yuan exchange rate 40% lower against the United States dollar, so that Chinese iron and steel export products become very cheap in the United States market and vice versa, iron and steel imported products from the United States become expensive in the Chinese domestic market.

In the case of the iron and steel trade between the United States and China, the United States Government together with Congress, AISI (American Iron and Steel Institute) and USWA (United Steelworkers) accused the Chinese Government of deliberately setting the Yuan exchange rate much cheaper than the price of the United States Dollar. According to them, from 1994 to July 2005 the Chinese government has set the Yuan exchange rate at 8.28 or 40% cheaper than the United States Dollar, which correlates with the low price of Chinese iron and steel in the United States market and the trade deficit of American Iron and Steel with China of 4.6 million metric tons (Hakim, 2011, p. 36).

For the United States, if this condition is left unchecked, it will lead to the deindustrialization of iron and steel which will lead to massive layoffs in the iron and steel sectors. Therefore, the United States is trying its best to pressure China to appreciate the Yuan exchange rate so that an exchange rate balance is achieved. Such strong pressure from the United States paid off little in 2005 when China was willing to appreciate its currency by 21.1% to 6.83 yuan per dollar (Hakim, 2011, p. 37).

Of course, this is still far from enough for the United States, considering that the Yuan exchange rate was previously set at 40% cheaper than the dollar and should have been in the position of 4 yuan per dollar. Not wanting to cause further damage to the country's iron and steel industry, Senators Charles Schumer and Lindsey Graham sponsored the imposition

of a 27.5% tariff on Chinese iron and steel products.

The Chinese Government also exercise dumping strategy on the price of export steel, which led to the price of Chinese steel being cheaper in the United States market than in the Chinese domestic market itself. The issue conveyed by American steel producers to the United States Department of Commerce. According to the manufacturers, U.S. Stell Corp, Evraz Rocky, Mountain Steel Mills and TMK IPSCO, Chinese steel producers have flooded the American steel pipe market at very low prices. China's steel exports rose from 900,000 tons to 2.2 million tons in 2008.

In terms of enforcing environmental standards, the government has conflicting interests so that its role does not run optimally. On the one hand, the government has an interest in maintaining sustainable development by supervising environmental standards, but on the other hand, the government as the owner of these companies and enjoys benefits in the form of dividends, taxes and job availability, strives to minimize the input cost of production costs in the form of pollution control costs.

The conflict of interest of the government has caused a lot of environmental pollution that the steel companies cannot act on, such as the Steel Industry Development in Henan Province which dumps its waste into reservoirs so that it pollutes the water flow for Beijing and Tianjin. AISI researchers during his visit to China in 2005 also found that Chinese steel companies ranging from small to large such as Jiangsu Shagang do not have adequate environmental standards such as bag houses, scrubbers and precipitators.

An indication of the non-compliance with environmental standards in Chinese steel companies is that air pollution such as nitrogen dioxide and sulfur dioxide is largely concentrated in iron and steel industrial areas. In addition, China also accounts for 25 percent of world emissions, with the steel industry as the largest contributor (Hakim, 2011, p. 39).

Demand Side Enhancement

The demand side in the market mechanism will have an impact on the supply side and price stability. With the high demand for Chinese iron and steel products, it will keep prices at a favorable point, and the achievement of economies of scale will contribute to the reduction of production costs. The Chinese government's intervention on the demand side was evident when the ban on the use of Chinese iron and steel in infrastructure projects funded by the U.S. Government's US$51.2 billion stimulus package reduced China's iron and steel exports to the country by 22.05 percent from 546,700 metric tons in November 2008 to 26,900 metric tons in July 2009. Furthermore, because exports are one of the components of consumption or demand, the decline in Chinese exports will certainly have an impact on the decline in the consumption or demand for Chinese iron and steel as a whole. In order to avoid a decrease in demand for their products, it is necessary to increase the consumption or demand for domestic iron and steel. And to create that demand, in May 2009 the Chinese government created very intense infrastructure projects with the use of iron and steel. The infrastructure project is summarized in the grand design of the economic stimulus package which is divided into eight priority sectors with a total budget of US$ 586 billion dollars or 4 trillion RMB (OECD, 2009).

The opening of foreign markets through regional free trade agreements can be seen from the ASEAN-China Free Trade Area (ACFTA) agreement that came into effect in 2010. After the United States' iron and steel protection policy in 2009, China compensated for the decline in exports by diversifying its exports to ASEAN countries. The reason for choosing this region to increase its exports of iron and steel products is because these countries are still very dependent on imported iron and steel products to meet their domestic needs. The development of China's iron and steel export market to ASEAN can be seen from the increase in Chinese exports since the third quarter of 2009. Previously, in the first and second quarters or from January to September 2009, China's iron

and steel exports to ASEAN accounted for only 17 percent of the country's total exports, but in the third quarter China's exports to ASEAN jumped to 26 percent of its total iron and steel exports (SEAISI, 2021).

Finally, the opening of the ASEAN market, which has been initiated by the Chinese Government since 2002, opened up space for an increase in Chinese iron and steel demand with the enactment of the ACFTA (ASEAN-China Free Trade Agreement) on January 1, 2010 which agreed to eliminate 144 iron and steel tariff posts. From point 23 MMT in 2009, China's exports increased to 40.5 MMT, nearly doubling in 2010, which continues to move nearly five times 110 MMT in 2015 (SEAISI, 2021).

CONCLUSION

The low technological and energy efficiency of China's iron and steel is not directly proportional to the competitiveness of its products in both domestic and international markets. Departing from this anomaly, this study aims to explain why China's iron and steel industry is able to compete in its domestic market as the world's largest exporter. Using the developmental state theory as an economic development model used by East Asian countries, such as Japan, South Korea, and Taiwan, it was found that the Chinese government sets the direction of development and increases the competitiveness of its iron and steel industry in every five-year development plan. The government also affects the sides Supply with a protection policy. To compensate for production inefficiencies, the Chinese government provides direct, indirect, and structural subsidies. From the side Demand, the government makes stimulus projects and opens up foreign markets through regional free trade agreements that allow for economies of scale.

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