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The Economic Effects of China's Distribution Industry: An Input-Output Analysis

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Abstract: This study contributes by analyzing the economic effects of China's distribution industry based on China's 2012 and 2017 input-output data. It analyzes changes in the forward and backward linkage effect over a five-year period in accordance with the Chinese government's distribution industry policy. The coefficients of the effects of the Chinese distribution industry, using Input-Output Tables and a comparative analysis of the sensitivity of dispersion, were determined. In terms of the coefficient of influence, most of the sectors that ranked high in 2012 are related to manufacturing, except for lodging and catering. The sensitivity and influence coefficients indicate that the top-ranked sectors in 2012 were more affected by the raw materials and energy essential for manufacturing development than by the services sector.

Keywords: China; input output analysis; economic effect; distribution industry

Citation: Choi, J.; Kim, W.; Choi, S. The Economic Effects of China's Distribution Industry: An Input-Output Analysis. *Sustainability* **2021**, *13*, 3477. https://doi.org/10.3390/su13063477

Academic Editor: Michael McAleer

Received: 25 February 2021
Accepted: 15 March 2021
Published: 21 March 2021

1. Introduction

Since joining the World Trade Organization (WTO) in 2001, China has continued to grow at an annual average rate of 6 percent. While the pace of growth is expected to slow down temporarily due to the 2020 COVID-19 pandemic [1], growth is expected to continue due to the Chinese government's aggressive stimulus policy. China, with 21 percent of the global distribution market in 2019, has become the second largest economic player after the United States [2]. This indicates China's progression from a global producer to a global retail consumer market, thus reflecting the government's efforts to shift its economic policy toward domestic-led high value-added economic growth. The outcomes of China's annual parliamentary meeting reflect the government's macroeconomic direction; specific actions influencing the economic sector since President Xi Jinping's administration are as follows. Under the Xi Jinping administration, the government is gradually lowering its economic growth target, while shifting from quantitative growth that encompasses new growth engines and structural reforms to qualitative growth. Specific efforts by the Chinese government to realize this have emerged in the form of the "Made in China 2025" ("Made in China 2025" is a strategy that aims to make China a manufacturing power in terms of quality by increasing its innovative capabilities in the future. The main goal is to strengthen manufacturing competitiveness through the convergence of existing manufacturing industries and the Internet.) and "One Belt, One Road" (China is pushing for a "one belt, one road" strategy to build a huge economic zone that encompasses more than 60 countries on the Silk Road on land and sea, starting with its own. With "one belt, one road," the strategy is to link infrastructure with individual countries and promote economic integration by expanding ultra-border trade investment and financing.) policies. However, while the government is upgrading its industrial structure to secure new growth engines, such as Internet Plus, which combines traditional industries with the

Internet for continuous economic growth, it is facing the negative impacts of the COVID-19 pandemic [3].

Although the infinite and abundant potential of China's domestic market can be very attractive to multinational retailers, the market has been saturated by fierce competition between domestic and foreign companies. In recent years, there have been cases in which multinational retailers have withdrawn from the Chinese market—especially Tesco, which has failed to implement a thorough localization strategy [4].

The distribution industry links production and consumption, thus managing the flow of product from producers to consumers. Retail sectors around the world are undergoing drastic structural changes as customers in all segments change their propensity from bricks and mortar to online "e-tailing" and "Omni-Channels" [5]. The distribution industry is important to the national economy, with a large industrial ripple effect; this follows from the fact that the institutionalization of all distribution functions, such as product development, physical distribution, and information distribution, is a necessary condition for companies in the distribution industry. The rapid global spread of COVID-19 is leading to significant change in the Chinese consumer market in 2020, with China taking measures such as extending the Lunar New Year holiday and introducing self-quarantine across the country to minimize transmission through human contact.

Recently, China has seen an increase in the size of the e-commerce market, as offline purchases have been brought online. Consumption of daily necessities such as food and medicine have soared due to the influence of COVID-19, and the introduction of online-to-offline (O2O) delivery services by offline stores is expanding. In addition, "Door to Door" delivery services are becoming more common as demand for contactless delivery increases. Such changes in consumption patterns will continue in the future due to China's high Internet and mobile penetration rates [5], and are expected to accelerate as next-generation technologies such as unmanned deliveries and telemedicine, which have been actively pursued by the Chinese government and platform companies, are commercialized. According to Hwang et al. [6], research indicates that the feasibility of food delivery services is being proven through unmanned delivery vehicles such as drones. This indicates that unmanned delivery and the introduction of telemedicine are not in the distant future.

Despite various measures by the Chinese government to boost domestic demand, including minimum wage increases since 2011, China's offline retail industry has been suffering from financial difficulties in recent years. To overcome this, Jack Ma Who was former executive chairman of Alibaba Group presented strategies in 2016 for five new future changes, including finance, manufacturing, technology, and energy, in addition to the concept of new retail [7]. New distribution has been defined as a consumer experience-oriented data-based distribution format, and is expected to shift the core of distribution from the traditional enterprise-focus to a consumer orientation [8]. It is evident that the leadership of the distribution industry, which used to be concentrated in offline distribution industries such as Walmart, is shifting to companies with consumer data, such as Alibaba and Amazon.

This study contributes by analyzing the economic effects of China's distribution industry based on China's 2012 and 2017 input-output data. It analyzes changes in the forward and backward linkage effect over a five-year period, in accordance with the Chinese government's distribution industry policy. In terms of economic effectiveness, the input and output analysis used in this paper was mainly used in traditional manufacturing industries, including steel and coal industries, where front and rear industries are clearly distinguished. However, it would be novel to apply the analysis in the tertiary service industry as well. In addition, China's input and output statements in 2012 utilized the division standard (42), but in 2017, they used the division standard (149) to conduct a more detailed analysis than the existing ripple effect analysis.

This analysis is expected to have theoretical and practical implications. The study is unique in observing changes in China's distribution industry by comparing and analyzing data output tables for 2012 and 2017. To date, few studies have analyzed China's economic

effects through industrial association analysis. Therefore, this study analyzes economic effects and discusses ways to develop the Chinese distribution market based on proven empirical results. The originality and significance of this study are as follows. The input and output analysis used in this paper was mainly used in traditional manufacturing industries, including steel and coal industries, where front and rear industries are clearly distinguished, but it would be novel to apply the analysis in the tertiary service industry as well. In addition, China's input and output statements used the industry classification criteria (42). However, in 2017, the industry classification criteria (149) were used to conduct a more detailed analysis than the existing ripple effect analysis. Furthermore, the prior study which presented 10 years of comparative research using existing Chinese input-output statements is not sufficient, so it can be considered significant in this paper.

2. Literature Review

2.1. Input and Output Model

Input-output analysis of the Chinese economy comprises the quantitative identification of the inter-industry interdependency structure through the industrial correlation table recorded on the matrix, according to a certain principle for a certain period of time. The industry association analysis of Leontief [9,10] is used as a representative model. In 1947, the United States released its first industrial correlation table since Leontief compiled a statistical chart on the national economy of the United States. Most countries around the world now draw up their own industrial correlation tables and use them to analyze their economic effects.

Recent studies of input and output models have emphasized the role of government policy and the modernization of management, which have been studied by means of mathematical models from existing research. Based on Leontief's industry-related analysis model, Bon [11] observed that price differences exist between internal and external suppliers, not only due to unintended direct effects but also indirectly due to price controls, wage controls, and other indirect effects in the market. It was seen that many risk factors, such as unstable political and economic conditions and lack of ability, could be avoided by the presence of multiple suppliers, and that advantageous conditions could be obtained through competition among suppliers. In addition, government policy emphasized that it would be more efficient to develop alternative institutional mechanisms for value and choice by providing sufficient information on market responsiveness.

Reyes [12,13] studied the input-output model, with an emphasis on the endogenous pricing process and on several basic assumptions of the model's pricing process. The pricing process in the distribution market is described as a dual solution to the existing quantity input and output model, and is said to be related to Von Neumann's General Equilibrium Growth Model. In addition, several analytical methods were proposed which use price solutions; examples of endogenous price calculations for empirical data were presented. Reyes [12,13] also theoretically interpreted the open input and output model in terms of demand and supply, suggesting that demand-based versions are produced as a function of final demand when production technology is given, whereas added value determines output in the supply-side version. In other words, producers should induce sales to achieve the desired level. Reyes [12,13] argued that the supply-side model's logic does not mathematically conflict with Leontief's argument. Ebiefung [14] and Dente [15], who adopted a mathematical and quantitative perspective, used applied mathematics to demonstrate the linkage of the transactional relationship to the input and output scenarios. They emphasized that the industry association analysis can connect interdependent structures between industries mathematically and quantitatively. A recent study highlighted the need for adoption of the Fourth Industrial Revolution within the distribution industry, including new cloud computing technology and the efficiency of the Internet of Things or the new Internet of Things. Studies indicated that distribution should be able to comprehensively use modern management quality and governance capabilities through

cross-border economic management information systems, based on the modernization of corporate management across industry boundaries [16].

Recent research showed that input and output technologies are used in consideration of both demand and supply aspects. In particular, it is true that the correlation between the International Input-Output Association (IIOA) disaster impact analysis and input-output technology is high and represents a solution to some shortcomings. The focus was on input-output technology, which has drawn attention as a tool to quickly assess successive economic impacts; it was observed that expressions of the reverse and forward connections permitted by input-output models could contribute to identifying major sectors, various change factors, and system sensitivity, and to conducting economic comparisons [17,18]. The empirical composition of the I/O model (e.g., product-by-product, industry-specific tables) includes various practices and procedures underlying the model and is considered to be provided by a physical input and output table that constitutes a key tool in the analysis of the pure monetary economic environment. The cross-industry economic effects analysis indicated that the main contributing tool [19–21].

2.2. Status of China's Distribution Industry

To know the nature of China's current distribution system, it is first necessary to understand the past distribution system. Chinese distribution has been researched from various perspectives, including traditional and recent trends in the distribution industry [22], individual income disparity [23], and population trends [24]. China's production and distribution before the mid-1980s were carried out in accordance with the government's planning and control. The distribution market has long comprised a traditional distribution system that has moved as a state-owned commercial unit into urban areas, thus forming a very rigid and inefficient distribution network [25]. China's distribution market has been shaped by an inefficient structure, with a larger interest in external trade and leaders insisting on liberalizing the system [26]. With the introduction of reforms in the mid-1980s, domestic enterprises gradually moved from central government control to provincial areas, and met certain trading volumes in the late 1980s, either through imported direct local government imports or through export transactions. Distribution policy is the latest concern in China's distribution industry. There can be no real market access without the distribution of authority [27].

A study by Ling and Eugene [28] emphasizes the government's role as a success factor in the distribution strategy, and stresses that the most important fact in recent changes in Chinese distribution is that the distribution structure is determined to some extent by economic development and government policy. During the 1990s, considerable pressure was placed on China's complex and cumbersome retail market. In the 2000s, the IT industry, ranging from traditional retail distribution to today's futuristic new retail, has led the transformation of the Chinese retail industry in three stages.

In the 2000s, China has been making more active investments in multinational corporations (MNEs) than in the past, when the perception of multinational companies' investments was not favorable [29–33]. However, China's overseas direct investment has recently increased unprecedentedly due to strong government support, and overseas distribution has also increased in the past 10 years. The rapid spread of COVID-19 is significantly impacting on and changing China's distribution market [34]; China's traditional retailers are shifting to include online components in their businesses, and are reporting that the distribution market, which supplies food online and delivers goods to consumers, is growing at the fastest pace, with the performance of e-Commerce-oriented businesses 16 percent higher than the global average [35].

A comprehensive review of prior studies shows that the focus in most countries has been to analyze economic effects by industry, since Leontief compiled a statistical table for industry-related analysis. Recently, to emphasize the need for the adoption of the Fourth Industrial Revolution by the distribution industry, new cloud computing technologies and the Internet of Things have begun to emphasize the efficiency of industries, thus suggesting

that the modernization of corporate management and the ability to manage quality and governance should be made comprehensively available.

3. Research Method and Empirical Analysis

3.1. Research Method

3.1.1. Basic Structure of Input-Output Tables

An Input-Output Table is a comprehensive statistical table that records all transactions related to the production and disposal of goods and services occurring within a given economy over a period of time, according to certain principles and formats presented in the studies of Dente [15] and Ebiefung [14]. That is, it comprises a statistical table of goods and services produced within an economy, indicating the sector in which it is made and the sector in which it is consumed.

The input-output table is a table of all transactions of goods and services within the national economy, based on the derivation of the influencing and sensitivity coefficients used in this paper. It is a statistical chart that systematically records transactions between industries and industrial sectors and the final demand according to a certain format. It is used to analyze the economic structure and measure the ripple effects of economic policies. The industrial correlation table consists of three parts, denoted by I upper, II upper, and III upper.

In Table 1, the I upper limit is the core of the industrial correlation table, which fully presents the technological and economic relationship of mutual dependence and constraint between each commodity sector of the national economy. This reflects the entire process of interdependence and mutually provided labor production and consumption among different sectors of the national economy. Further, the name, arrangement order, and number of goods represent a matrix of intermediate goods in which the longitudinal and transverse axes coincide and intersect. The longitudinal axis is called intermediate input, and the transverse axis is called intermediate consumption.

Table 1. Basic structure of Input-Output Tables. (Unit: Ten thousand, Yuan).

Input \ Output	Intermediate Consumption (Each Industry)	Final Consumption (Final Consumption, Total Capital Formation)	Import	Others	Total Output
Intermediate consumption (each industry)	I Upper limit		II Upper limit		
Value added (labor wage, total producer amount, depreciation amount of fixed assets, surplus of business)	III Upper limit				
Total input					

Source: National Economic History of the Bureau of National Statistics of China (2017 year Input-Output Table) (2020 year).

Upper II is an extension to the horizontal direction of Upper I. The vertical part is the same as the upper limit of I, and the transverse section comprises the final use item, such as the final consumption, the total amount of capital formation, and income. Within a row, the goods or services produced by the output segment are used in the final value of each item. From the column direction, each item is reflected in its final used size and composition. The upper limit of I and II are the consecutively constructed horizontal tables that reflect the source of the use of goods or services produced in each commodity sector of the national economy. This refers to the quantity of intermediate and final consumption of each commodity segment.

Upper III is the extension of the vertical direction of Upper I. The longitudinal sector is created with various value-added items such as workers' wages, total producer's amount, fixed asset depreciation, and operating surplus, and the transverse sector is the same as the I upper limit. The III upper limit reflects the added value of each commodity sector and its composition. As indicated earlier, the industrial correlation table is interconnected into

three sectors, and each part of the national economy in terms of total volume and structure systematically reflects the entire process from production to final use.

3.1.2. Leontief Model

In this study, the influence coefficient (rear association effect) and sensitivity coefficient (front association effect) of Leontief [9,10], who first developed the industry association analysis as a research tool to be used for the economic effect analysis of China's distribution industry, are as follows. First, the coefficient of influence indicates how the final demand in the production of a given industrial sector affects other industrial sectors when an additional unit of production occurs, and the formula for the coefficient is as follows.

$$F_j = \frac{\sum_{i=1}^{n} \overline{b_{ij}}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} \overline{b_{ij}}} \ (j = 1, 2, 3, \ldots\ldots\ldots) \quad (1)$$

In the formula for the coefficient of influence, $\sum_{i=1}^{n} \overline{b_{ij}}$ is the sum of column j of the formulation of the inverse matrix of the Leontief, and the increase in section j is the final product of a unit. In addition, $\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} \overline{b_{ij}}$, which represents the total demand for each segment of the national economy, is the average of value e of the consensus of the Leontief inverse matrix. A coefficient of influence greater than one means that the additional unit of production in the jth segment is greater than the average impact figure for the extent of the ripple produced by other industrial sectors. A reading of one means the same as the average impact figure, and a reading below one indicates less than the average impact figure. In other words, the higher the coefficient of influence, the higher the sector's influence over other industries. Second, the sensitivity coefficient refers to the effect that a certain industry sector receives when the final demand for products for all industrial sectors is generated by an additional unit of production. In other words, the modulus of the sensitivity coefficient as a coefficient of the forward linkage effect is as follows:

$$E_i = \frac{\sum_{j=1}^{n} \overline{b_{ij}}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} \overline{b_{ij}}} \ (i = 1, 2, 3, \ldots\ldots\ldots) \quad (2)$$

A coefficient of sensitivity greater than one indicates that the sensitivity level received by the ith segment is higher than the average level. One indicates the same as the average level, and less than one indicates lower than the average level. In other words, the greater the sensitivity coefficient, the more widely are raw materials used—also in other industries, which can be seen as having a greater impact on related industries.

Dente [15] and Ebiefung [14] indicated that industry association analysis produces results based on applied mathematics, which is a methodology that shows inter-industry interdependent structures being mutually influenced, mathematically and quantitatively. Kang [16] also emphasized that the industry-related analysis of the ripple effects of the Chinese distribution industry indicate how the influence extends beyond the industry boundaries, such as the emphasis on the need for the Fourth Industrial Revolution, new cloud computing technologies, and the efficiency of the Internet of Things or the new Internet industry.

3.2. Empirical Analysis

3.2.1. Analysis of Influential Factors

In deriving the influence coefficient of China's distribution industry, a limit is encountered to the writing of all 42 divisions of China's 2012 industrial correlation table. Thus,

19 categories with a value of 0.08 or higher were selected out of 42 categories of the total consumption coefficient. For each of the 19 categories, the impact coefficient formula was used to derive the results, which were compiled in the order of the higher coefficients (see Table 2). The influence coefficient derived in Table 3 refers to the backward linkage effect on all sectors when the demand of the Chinese distribution industry increases by one unit.

Table 2. The Influence Factor of China's Distribution Industry in 2012.

	Influence Coefficient
Professional equipment manufacturing	3.780887
Lodging and restaurant business	2.600737
Other manufacturing	1.370608
Meter/measuring instrument manufacturing	1.340107
Manufacturing of telecommunication and other electronic equipment	1.293867
Manufacturing of electromechanical and equipment and materials	1.252527
General manufacturing	1.236126
Metal products, mechanical equipment repair service	1.235980
Transit transportation equipment manufacturing	1.227700
The chemical industry	1.188494
Clothing, leather, and other manufacturing	1.162317
Textile industry	1.152090
Wood processing and furniture manufacturing	1.129676
Manufacturing of paper, printing, and cultural products	1.126413
Rental and business services	1.006274
Research/experimental development work	0.985279
Food manufacturing and tobacco manufacturing	0.960022
Social Security and health and welfare	0.947623
The cultural, physical, and entertainment industries	0.792537

Source: Of the 42 categories of the total consumption coefficient of China's 2012 Input-Output Statement, 19 categories for $(I - A)^{-1}$ over 0.08 were added to the list. A limit of 0.08 or more refers to the total consumption of 42 categories to the ground they set at your disposal standards due to the higher coefficients of the 19 categories that were selected as the sector.

Considering the influence coefficient of China's distribution industry in the higher order in Table 2, we can see that the manufacturing of specialized facilities is 3.78087; the lodging and restaurant industries are 2.600737; and other manufacturing industries are 1.370608. This can be interpreted as an increase in the 1.370608–3.780887 units in the Chinese retail industry. In addition, the top-tier sectors show that most of them are related to manufacturing, except for lodging and restaurant businesses. In other words, the development of China's distribution industry has had a positive impact on the development of China's manufacturing industry.

While China's industrial structure is shifting from secondary manufacturing to that of a tertiary service industry, it is believed that the secondary manufacturing industry still has a significant impact on the Chinese economy, and is also related to the Chinese government's "China Manufacturing 2025" policy to upgrade manufacturing [36]. The policy goal of "China Manufacturing 2025" emphasized the will to foster the top 10 core industries in the long run; it can be seen as a policy that addresses past problems and presents a long-term vision for China's sustainable growth, which focuses on the transformation of manufacturing to high value-added manufacturing.

The higher order in Table 3 indicates that the influence coefficients of China's distribution industry are 1.43236 for calculators, 1.3882 for audiovisual equipment, and 1.38242 for communication facilities. This can be interpreted as an increase of between 1.38242 and 1.43236 units in these sectors, with the additional input of one unit to the Chinese retail industry. Compared to 2012, the results indicate that the Chinese distribution industry does not have a large range of influencing factors on other industries. However, considering the industrial groups ranked at the top of the list, the influence is believed to be an extension of

the "China Manufacturing 2025" policy to upgrade China's industrial structure, which was implemented in 2012. This follows because the transition is considered as being toward the tertiary service industry, which differs significantly from the traditional manufacturing industry sectors such as calculators, audiovisual equipment, and telecommunication facilities; the results are more specific than for 2012.

Table 3. Impact factor of China's distribution industry in 2017.

	Influence Coefficient
Calculator	1.43236
Audiovisual equipment	1.3882
Communication facility	1.38242
Broadcasting and television equipment, radar, and support equipment	1.36138
Culture and business machine	1.34114
Textile and knitting products	1.31863
Electronic parts	1.312
Other electrical machinery and equipment	1.29027
Home appliances	1.2867
Transmission and distribution and control equipment	1.25345
Textile fibers	1.25188
Other transportation equipment	1.25097
Material handling equipment	1.23243
Electricity	1.23156
Railway transport and urban railway transport equipment	1.2305
Special equipment for mining, metallurgy, and construction	1.19113
Ship and related devices	1.18801
Wholesale business (distribution business)	0.64203

Source: Of the 42 categories of the total consumption coefficient of China's 2017 Input-Output Statement, 19 categories for $(I - A)^{-1}$ over 0.08 were added to the list. A limit of 0.08 or more refers to the total consumption of 42 categories to the ground they set at your disposal standards due to the higher coefficients of the 19 categories that were selected as the sector.

3.2.2. Analysis of Sensitivity Coefficient

Derivation of the sensitivity coefficient of China's distribution industry is limited in the preparation of all 42 divisions of China's industrial correlation table for 2012. Thus, 19 categories with a coefficient of 0.01 or higher were selected out of the 42 categories of the total consumption coefficient. For each of the 19 categories, the results were derived using the sensitivity coefficient formula and compiled in descending order (see Table 4). The sensitivity coefficients derived in Table 4 refer to the forward-linked effect of how the Chinese distribution industry's demand was affected by the whole sector when increased by one unit.

The sensitivity coefficient of the Chinese distribution industry in the high order in Table 4 is 3.451570 for the chemical industry, 2.891365 for the metal smelting and rolled-up industry, and 1.932049 for the power, heating production, and supply industry, that is, in the range 1.932049–3.451570. This can be interpreted as an increase of between 1.932049 and 3.451570 units in the Chinese retail industry. In addition, results for the top-tier sectors indicate that they were affected more by raw materials and energy, which are essential to the development of the manufacturing industry, than by the service sector, as indicated by the coefficient of influence.

Table 4. The Sensitivity Factor of China's Distribution Industry in 2012.

	Sensitivity Coefficient
Chemical industry	3.451570
Metal smelting and rolling processing industry	2.891365
Power, heating production and supply	1.932049
Agriculture, forestry, and fisheries	1.816505
Manufacture of telecommunications and other electronic equipment	1.623966
Wholesale business (distribution business)	1.613322
Finance industry	1.596233
Transportation and warehouse and Postal service	1.529516
Oil processing, refining, and fuel processing business	1.458722
Oil and natural gas mining	1.410033
Food and tobacco processing business	1.334023
Coal mining industry	1.232892
Lease and Business services	1.099991
Manufacturing of electromechanical and equipment and materials	1.066103
Manufacturing of paper, printing, and cultural products	0.973310
Metal products industry	0.945255
Transportation and Transportation equipment	0.924222
Real estate industry	0.604929
Resident services and Other services	0.529331

Source: Of the 42 categories of the total consumption coefficient of China's 2012 Input-Output Statement, 19 categories for $(I - A)^{-1}$ over 0.01 were added to the list. A limit of 0.08 or more refers to the total consumption of 42 categories to the ground they set at your disposal standards due to the higher coefficients of the 19 categories that were selected as the sector.

These results are thought to be related not only to the government's "China Manufacturing 2025" policy, but also to the long-term "One Belt, One Road policy." The latter is China's national strategy, conceived with the aim of forming a new silk road economic bloc encompassing land and sea, which can be considered as a vision for China's foreign routes over the next 35 years. The Chinese government expects the one-on-one policy to help solve internal and external structural problems such as worsening domestic demand due to the trade conflict between the U.S. and China, and oversupply caused by duplicated production.

The sensitivity coefficients of the Chinese distribution industry in the high order (see Table 5) are 4.9087 for electricity and heat production and supply; 4.56022 for electronic components; and in the range 4.14273–4.9087 for financial and other financial services. Compared to 2012, the overall extent of the sensitivity coefficient of the front industries affected by the development of the Chinese distribution industry are greater compared to the influence coefficient. The severely affected industrial groups in 2012 were the chemical industry, metal smelting and rolling gas industry, and power, heating production, and supply industry; however, this is becoming more specific and advanced in 2017. This can be seen as a "One Belt, One Road" [37]; if the "China Manufacturing 2025" policy has had a significant impact on the coefficient of influence, then there would have been more impact on the 2015 coefficient. While the policy that influenced the influence coefficient was "China Manufacturing 2025," the policy that influenced the sensitivity coefficient was "One Belt, One Road." As a result, while the "One Belt, One Road" policy implemented by the Chinese government has encountered many obstacles, it is believed that the Chinese government's intent is gradually making impact within China.

Table 5. The Sensitivity Factor of China's Distribution Industry in 2017.

	Sensitivity Coefficient
Electrical and heat production and supply	4.9087
Electronic parts	4.56022
Financial and other financial services	4.14273
Office service	3.99376
Refined petroleum and nuclear fuel works	3.12797
Wholesale business (distribution business)	2.84371
Retail business	2.74231
Oil and gas extraction products	2.72406
Road freight and transportation support activities	2.56755
Real estate industry	2.06557
Automotive parts and accessories	1.92189
Paper and paper products	1.87833
The catering industry	1.22538
Specialized technical service	0.99871
Playing printed and recorded media	0.82052
Postal service	0.76551
Water cargo transport and Transport support activity	0.76159
Handling and storage	0.68668
Home appliances	0.49116

Source: Of the 42 categories of the total consumption coefficient of China's 2017 Input-Output Statement, 19 categories for $(I - A)^{-1}$ over 0.01 were added to the list. A limit of 0.08 or more refers to the total consumption of 42 categories to the ground they set at your disposal standards due to the higher coefficients of the 19 categories that were selected as the sector.

4. Conclusions

China constituted the second largest share (21 percent) of worldwide distribution markets and the second largest global manufacturing base after the United States in 2019 [2]. The retail consumer market will react according to the umping changes. The study also reconfirmed the importance of China's distribution industry, since there is extensive discussion in Dente [15] and Ebiefung [8] and utilization in the Chinese input-output 14statements of 2012 and 2017. The coefficients of the effects of the Chinese distribution industry, using Input-Output Tables and a comparative analysis of the sensitivity of dispersion, was determined. The following aspects emerged from the analysis.

First, in terms of the coefficient of influence, most of the sectors ranked high in 2012 are related to manufacturing, except for lodging and catering. In other words, the development of China's distribution industry has had a positive impact on the development of its manufacturing industry. Although China's industrial structure is shifting from a secondary manufacturing industry to a tertiary service industry, it is believed that the secondary manufacturing industry still has significant influence in the Chinese economy, and is also related to the Chinese government's "China Manufacturing 2025" policy that aims to upgrade manufacturing. The overall extent of the Chinese distribution industry's influence on other industries is not significant in 2017 compared to 2012 [38,39].

Second, the sensitivity and influence coefficients indicate that the top-ranked sectors in 2012 were more affected by the raw materials and energy essential for manufacturing development than by the services sector. This is likely to be linked not only to the Chinese government's "China Manufacturing 2025" policy, but also to the "One Belt, One Road" policy, which is expected to help solve China's current structural problems. This result is consistent with previous studies [10,11]. The results indicate that the breadth of the coefficient of reduction in the forward industries that are affected by the development of the Chinese distribution industry in general is greater in 2017 than in 2012 when compared with the coefficient of influence [38,39].

Interdependent industrial structures can be connected with quantitative and mathematical methods, emphasized by the latest research findings. The research and findings are

supported by previous studies [14,15,17,18], and have the following implications: First, the top-ranked sectors according to the impact factor are aligned with the upgrade of China's industrial structure, which was undertaken in 2012 as an extension of "China's manufacturing 2025" policy. Unlike calculators, existing traditional manufacturing industries (e.g., audiovisual equipment), and communications facilities, it is believed that in the process of evolution to the tertiary service industry there has been more progress in comparison to the results of 2012. Second, results indicate that the most affected industrial groups in 2012 in terms of sensitivity coefficient will be transformed into more specific and advanced industries based on the "One Belt, One Road" policy. While this exposes "One Belt, One Road" implemented by the Chinese government to various problems, it can be seen that the Chinese government's intent is gradually progressing within China.

The following is a closer consideration of "China Manufacturing 2025"—a policy of the Chinese government that has a significant impact on the Chinese retail industry. First of all, "China Manufacturing 2025" was announced by Chinese Premier Li Keqiang in 2015 to revitalize the manufacturing industries. In the past, China's economic growth depended on quantitative growth in manufacturing industries; the goal is now to join the ranks of manufacturing powerhouses by 2025 through qualitative growth based on increased innovative capabilities. It comprises nine major tasks, including enhancing manufacturing innovation and strengthening basic capabilities, such as next-generation IT technology, precision numerical control, robots, and aerospace equipment, for five major strategic industries.

Next, the "One Belt, One Road" policy [40] refers to the "concept" and "vision" for China's external routes over the next 35 years. "One Belt" refers to the "silk road economic belt" that links China to Central Asia and Europe, and "One Road" refers to the "21st century marine silk road" linking Southeast Asia-West Asia-Europe-Africa. This is expected to contribute to solving China's current structural problems; "China Manufacturing 2025" and "One Belt and One Road" are therefore mid- to long-term large-scale projects that will inevitably affect China's overall industrial and economic structure, including its distribution industry.

The originality and significance of this study are as follows. The input-output analysis used in this paper was mainly applied to the traditional manufacturing industries, including steel and coal industries, which are clearly distinguished from the leading and lagging industries; however, the application to the third service industry is very original. In addition, this study was conducted because the 2012 China Input-Output statement used the division criteria (38), while the 2017 Industrial Classification criteria were more specific and detailed than the existing ripple effect analysis; prior research over 10 years using the existing China Input-Output Table was not sufficient.

In conclusion, China's industrial structure has been upgraded every five years, thus changing its influence on other industrial groups; we believe that this will not be easy to apply to other countries. However, China's unique system comprises a five-year plan that highlights the emergence of a group of industries every five years, and large-scale projects such as "One Belt-One Road," "China Manufacturing 2025," and others have recently been implemented [36,41,42]. The author is of the opinion that factors such as the Chinese government's policy affects the ranking of the influence and sensitivity coefficients.

The limitation of this study is that the analysis is based on historical rather than current data. Since the publication of the Chinese Input-Output Table is delayed by an average of two to three years, it is clear that there are difficulties in analyzing the current industrial relationship. While research results for a specific point in time provides important implications, follow-up studies should be conducted continuously over a long period of time to elucidate development trends. Based on this, we will be able to infer the future direction of development, in consideration of current economic policies, thus producing richer research results.

Author Contributions: All authors have contributed to this paper. J.C. designed the research and wrote the manuscript. W.K. designed the research and helped revise the manuscript. S.C. analyzed

the data and wrote the manuscript. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Date is not publicly available.

Conflicts of Interest: The authors declare no conflict of interest.

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