The Influence of Policy on Electronic Devices Manufacturing Reshoring under the Impact of Coronavirus Epidemic

Yueqi Yang

***Abstract*—As the topic of manufacturing reshoring becomes prevalent in manufacturing industry, the businesses have increasingly wondered the strategy of bringing back manufacturing jobs to the United States. The purpose of this paper is to evaluate the effects of policies which were made during coronavirus epidemic on the trend of reshoring manufacturing industry, with specific focus on computer and electronic devices manufacturing industry. There are three policies to be evaluated and analyzed: China's lockdown policy, United States' monetary policy and United States' quarantine and social distancing policy. This research focuses on applying the theories and viewpoints of relevant journals to the influence of three policies. Moreover, this research collected and analyzed the data from government websites and reports of consulting companies. Simple statistical calculation was conducted in order to show the trend and compare before and after the policies were implemented. China's lockdown policy and United States' monetary policy have positive effects on the trend of electronic devices manufacturing reshoring. However, United States' quarantine and social distancing policy, which exacerbated the existing problem of labor shortage, are the obstacles for businesses to actually implement manufacturing reshoring.**

***Index Terms*—Reshoring manufacturing, policy, covid-19, electronic devices manufacturing, supply chain, risks.**

I. Introduction

Reshoring manufacturing is a very popular topic in the United States for the recent several years. Trump administration put in large effort in bringing the manufacturing jobs back to the United States. In electronic devices manufacturing, corporations tend to offshore their manufacturing plants to other countries in the past. Strategic decisions were often made to reduce costs and transfer risks and responsibilities to offshore subsidiaries and suppliers [1]. However, manufacturing reshoring becomes a popular option for corporations. Reshoring, it is generally defined as moving manufacturing back to the country of its parent company [2]. There is a trend for companies bring their facilities and plants back to the United States due to certain factors. There are four reshoring drivers: Risk, uncertainty and ease of doing business, Cost-related, Infrastructure-related, Competitive priorities [3]. This essay will explore that what is the impacts of the policy on the factors and the trend of reshoring manufacturing during coronavirus epidemic, especially electronic manufacturing industry. This essay uses the data directly from reports of consulting companies, and analyzes data from the government websites and stock markets. After analyzing the data, this essay finds the influence of coronavirus and policy making on the factors of reshoring electronic manufacturing. The aim of this research is to help electronic businesses have more knowledge about the trend of reshoring manufacturing with the impacts of policy during the coronavirus pandemics, so that they are able to make more rational decisions.

Manuscript received May 9, 2021; revised July 5, 2021.

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II. Literature Review

Reshoring is a popular topic among political, academic and business field. While companies offshored numerous facilities to other developing countries. In the past decades, many scholars attracted by this topic and analyzed various factors of manufacturing reshoring. Foerstl, Kirchoff, and Bals [1] specified Human and behavioral factors, transactional factors, transaction cost economics (TCE) and organizational buying behavior (OBB) theories in reshoring. Foerstl, Kirchoff, and Bals [1] developed theoretical framework of reshoring decisions, and an extensive summary of reshoring drivers. There was also a research study that summarized and identified emerging factors of reshoring, sensitivity of those factors toward reshoring, and the development of reshorability index that measures the likelihood of reshoring [4]. According to the calculated reshorability index, electronic industry has a relatively high reshorability index which indicates that this industry is more likely to implement manufacturing reshoring comparing to other industry. Risks is an important factor to consider during coronavirus. An extensive literature review and a qualitative study comprising 14 in-depth interviews and a focus group meeting with senior supply chain executives done by Manuj and Mentzer [5]. This paper defines different types of risks in global supply chain and explores six risk management strategies [5].

Ciabuschi, Lindahl, Barbieri and Fratocchi [6] also focus on the risks and defining risks. The authors built on the logic of the internationalization process model. In addition, it associates risks management with reshoring decisions by evaluating the impacts of different kinds of risks on manufacturing reshoring [6]. However, coronavirus is a global issue, and is dynamic since it is highly possible there will be a second-wave pandemic. It is hard to put the risk of coronavirus into a certain category specified in this journal. Bekaert, Hoerova, and Lo Duca

Ref. [7] have attempted to provide a first characterization of the dynamic links between risk, uncertainty and monetary policy, using a simple vector-autoregressive framework.

doi:10.18178/joebm.2021.9.3.655

Nonetheless, there is a lack of research applies theories of manufacturing reshoring, especially electronic manufacturing reshoring, to the specific policy making. This essay fills the gap by evaluating the influence of policies during coronavirus on electronic manufacturing reshoring.

III. Chinese Lockdown Policy

The offshore countries had policies which require lockdowns caused a disruption of supply chain. In response to coronavirus, China had a policy which required everyone to quarantine at home for from January to March. In Early 2020, China's government has put in many efforts and made policy decisions to control the coronavirus, such as the city lock-down, quarantining the suspected infectious cases and their close-contacts, setting health check point at crucial traffic nodes [8]. By March 2020, these China's government policies were effective and successful in controlling the slowing down the growth rate of the cumulative infectious cases in majority cities of China, including the epicenter of Wuhan [8]. This policy caused a significant decrease in suppling parts of electronic devices. According to the data from China custom, the value in the Automatic Data Processing Equipment and Parts which belongs to the electronic manufacturing industry decreased by at least 30 percent from December in 2019 to January in 2020 when the lockdown policy executed in China, as shown in Fig. 1.

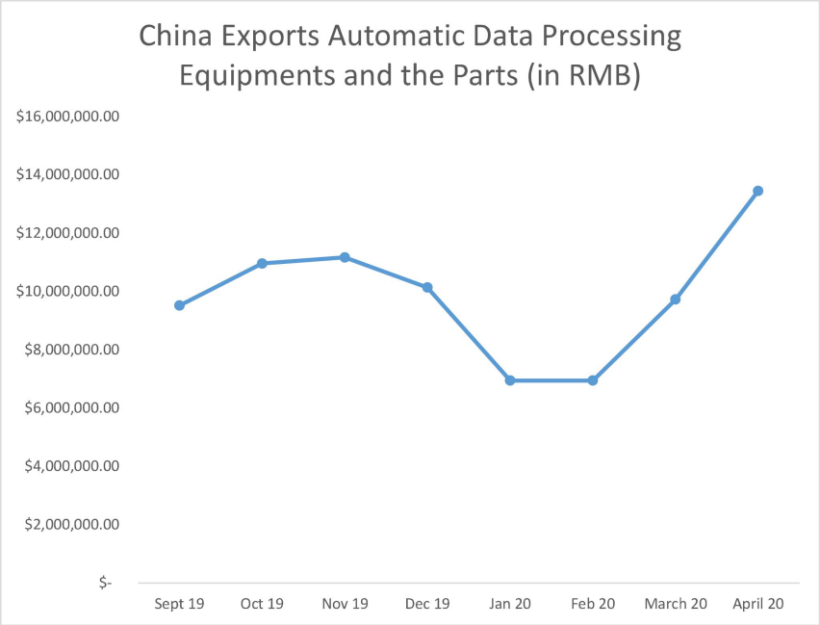

Fig. 1. China exports automatic data processing equipments and the parts.
Data Source: www.customs.gov.cn

While China is still one of the largest electronic devices and parts suppliers to the United States. As a result of the Chia lockdown policy and the decrease in the value of exporting goods, many businesses in the United States countered the disruption in their supply chain and started to consider reshoring. In Mckinsey Report, 73 percent encountered problems in their supplier base, and 75 percent faced problems with production and distribution. 93 percent of respondents say that they plan to increase the level of resilience across their supply chain [9]. When the supply chain faces high external risks, hedging and high levels of investment are justified and valuable [5]. Moreover, the risks and liability issues associated with

outsourcing industrial operations are a major decision driver for the manufacturing industries [6]. The external risks associated with supply chain will incentivize more businesses to consider reshoring. When there are more external risks, it is rational for businesses to have multiple sources including the options of bringing back their manufacturing facilities. China's quarantine policy designated to protect citizens at all expenses, regardless the negative impacts on economy. It is the task for business in the United States to react quickly to the risk and build a resilience supply chain in order to deal with the risks.

IV. Monetary Policy

Monetary policies incentivized companies to adopt the strategy of reshoring. There are numerous Monetary policies in order to revitalize the economy during coronavirus. In order to manage the effects of COVID-19 on the economy, the Federal Open Market Committee (FOMC) lowered the target range for interest rate by a total of one to one and half percentage points—from a range of one to one and half percent to nearly zero percent [10]. As a result of the low interest rate and issuing money, US Dollar Index has a negative trend. One important reason for businesses to offshore is the differences between the value of US dollars and the currency of the offshoring countries. Many electronic companies have plants in Asia countries where the local currency index is very low. For the United State, there is a large trade deficit due to the differences between the value of US dollars and the value of local currencies. If US dollar index keeps going down, the difference between the value of US dollars and the value of local currencies is going to be smaller. Having a low dollar value means it costs less to manufacture products onshore comparing to offshoring, which indicates the costs differences between

onshore and offshore will be smaller than before. As a result, the low dollar value could help the electronic device manufacturing industry to implement reshoring.

In addition to the Monetary Policy's influence on US Dollar Index, nearly zero-interests rate encourage companies to make investment. The electronic manufacturing industry requires numerous kinds of parts in order to assemble and make a complete product. However, there are neither enough qualified suppliers of parts nor enough flexible capacity to produce the parts of the electronic devices. When Apple was planning to make computers and electronic devices in Austin, Texas, it was unable to find enough suitable parts for assembling the final products, according to three anonymous workers who worked on the project [11]. In China, Apple relied on factories that have great flexible manufacturing process and can produce vast orders of suitable parts in short lead time [11]. If the electronic devices businesses want to bring back their manufacturing factories, they have to invest in expanding and improving their capacity in order to make all parts of their products. The low interest rate makes the large investment possible. Recently, many scholars explore a potential relationship between loose monetary policy and the tendency of risk-taking in financial markets [7]. Rajan [7] conjectures that in times of ample liquidity supplied by the central bank, investment managers have a tendency to engage in risky, correlated investments. To maximize and optimize returns when interest rate is low, the investment strategy of businesses would be less risk averse and prefer risky, tail-risk sensitive and illiquid securities [7]. Hence, low interest rate encourages companies to make investment in making the necessary parts of their products, even the risky investment which companies were aversion to before the monetary policy took place.

V. The Policy of Lockdown and Social-Distancing in the US

The policy of lockdown and social-distancing increases the severity of labor shortage which is an obstacle for electronic manufacturing reshoring. Before pandemics, there was a labor shortage in electronic manufacturing labor market. In the United States, people who are under 40 years old are not considering manufacturing workers as their career choices due to various reasons. According to a report done by The Manufacturing Institute and Deloitte, the U.S. manufacturing industry will expand and have 4.6 million jobs available in the next decade, but nearly 2.5 million jobs may not be filled due to a lack of skilled workers [12]. The reasons behind the lack of suitable labor is that, manufacturers halted hiring after the 2008 economic recession, which leads to a lack of workers from younger generation, and more and more baby boomers are retiring [12]. Hence the industry is now experiencing the shortage of labor both from the retiring workers and insufficient young skilled workers. The National Association of Manufacturers estimates that over the next decade, with the future expansion of the manufacturing industry, there will be a need of nearly 3½ million manufacturing jobs, and it is expected to have 2 million jobs unfilled due to the skills gap [13]. Under the coronavirus, the unemployment rate in manufacturing industry is increasing indicates that the labor shortage is increasing, as shown in fig. 2. The labor shortage is unlikely to be solved in the short term. In order to solve these challenges, Apple should have more investment in preparing children and young professionals with relevant skills. Apple and more companies in the electronic devices manufacturing industry can help to solve the issue of labor shortage and increase the number of American workers hired in the United States in the future [13]. In addition, there is a significant decrease in the employee's productivity due to social distancing and infected employees in the plants. The policy of lockdown and social-distancing was intended to keep the employee safe. However, in the electronic devices manufacturing industry where the labor shortage exists before covid-19, the decrease in the labor and productivity which caused by the policy is exacerbating this situation.

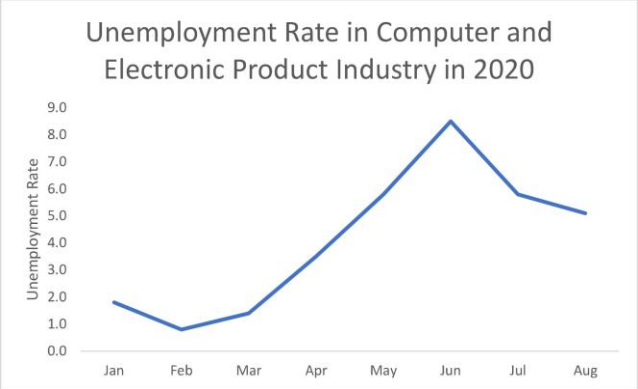

Fig. 2. Unemployment rate in computer and electronic product industry in 2020 Data Source: www.bls.gov.

VI. Conclusion

During the coronavirus epidemics, there are three policies influencing the trend of electronic manufacturing reshoring. China's required quarantine policy caused a disruption in supply chain which pushes electronic devices manufacturing companies to build a resilient supply chain by reshoring their factories. American Federal Reserve's monetary policy caused a lower US dollar index which is beneficial for reshoring. Moreover, a nearly zero interest rate monetary policy encouraged businesses to make more investment, even risky and bald ones. However, the policy of quarantine and social distancing are obstacles for electronic devices industry to implement reshoring their manufacturing factories. Even the supply chain strategy and suitable economy prefer bringing back manufacturing to the United States, with the labor shortage which is even worse under the influence of quarantine and social distancing policies during coronavirus, it is almost impossible to bring back the electronic manufacturing. It is impossible to resolve the labor shortage issue in short term. However, if electronic manufacturing businesses and government make more investment in training the talent, and providing more initiatives to attract talent, such as, "partnering with trade schools and community colleges to institutionalize curriculum that will better prepare students for software development and advanced manufacturing roles". After electronic manufacturing businesses and government taking

active role in solving the issue, labor shortage would be mitigated in the future, which would make electric manufacturing reshoring more possible.

There are maybe several potential limitations. This essay is primarily based on secondary data from consulting companies' reports which limits the scope of the analysis and makes obstacles in finding the up-to-date data and trends of the electronic manufacturing industry. There is a limited access to data and limited time to conduct the research. If there is a survey conducted which primary data and sources could be collected from electronic devices companies in order to make comparison of before and after the policies were implemented, there might have a clear and deeper insight in the trend of this industry.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgment

I would like to great thankfulness to Dr. Meer for his valuable guidance and constructive advices during all the stages of this research. I appreciated his willingness to give his time so generously.

Next, I would like to appreciate that my parents gave me valuable support and encouragement. They are always there for me. Finally, I could not have completed this research work without the support of my friends, Mr. Wang, who provided enlightening discussions as well as happy accompanying outside of my research.

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