THESIS

CHINESE TRADE & INVESTMENT IN THE 21ST CENTURY: THE IMPACT OF THE BELT AND ROAD INITIATIVE ON INDUSTRIALIZATION IN DEVELOPED & LESS DEVELOPED ECONOMIES

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ABSTRACT

CHINESE TRADE & INVESTMENT IN THE 21ST CENTURY:

THE IMPACT OF THE BELT AND ROAD INITIATIVE ON INDUSTRIALIZATION IN DEVELOPED & LESS DEVELOPED ECONOMIES

Over the past few decades, China's rise as a global industrial leader has profoundly impacted developed and less developed economies. Most recently, the Chinese government has pursued the Belt and Road Initiative (BRI) to increase its reach and integration into the global economy through trade and investment agreements with roughly 147 countries. Drawing on longitudinal data from 124 countries, I analyze the effects of Chinese trade and investment on the industrialization of developed and less developed economies in the 21st century. Specifically, I analyze whether participation in BRI agreements moderates these effects. The results indicate that Chinese trade and investment increase industrial employment and growth, especially in countries participating in the BRI. However, Chinese trade and investment have a more extensive negative impact on industrial productivity within BRI countries than their non-participating counterparts. While the results are mixed on the benefits and consequences of increased bilateral relations with China, they depict an interesting picture of how Chinese trade and investment affect foreign economies.

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Lastly, I would like to thank my wife, Tatiana, for all her help and understanding during this process , as well as our two dogs, Ollie and Persephone, and my parents Jim and Lori Cahill. I love you all and cannot wait for the next chapter. Viva los Miami!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1- Introduction

The Belt and Road Initiative (BRI) is a globalization effort spearheaded by President Ji Jinping to revitalize the old Silk Trade routes throughout Central and East Asia and Europe. This effort aims to enhance economic cooperation and bilateral relations between China and the region. Since its launch in 2013, China has formalized agreements under the BRI with about 75 percent of countries globally. More recently, the BRI has further expanded into Africa and South America, integrating China as a primary actor in the global economy. Overall, the BRI can be conceptualized as an extension of China's export-oriented industrial policy, which began in the 1980s.

On average, most countries have begun participating in the BRI around 2018. Zhang, Cheng, and He (2019) note that the lag times between initial foreign investments may take up to nine years before these effects are seen in the economic growth in foreign economies. Considering this analysis of delayed effects and due to the scale of the infrastructure projects, results may have only begun to materialize within participating countries. As we enter the 11th year of the BRI, we are starting to observe the differences in China's impact between countries that are part of formal agreements and those outside the BRI umbrella. This thesis seeks to identify how the BRI moderates the effects of Chinese trade and investment in foreign economies.

China's emergence as a global industrial leader and integration into the global economy can have profound implications. Notably, China Shock literature can depict a relatively grim picture of how Chinese imports negatively affect industrialization in foreign economies (Autor et al., 2014; Jenkins, 2015; Moreira et al., 2023). In other cases, increasing trade and investment exposure with China can positively influence industrialization in foreign economies (Darko et al., 2021; Doku et al., 2017; Mion & Zhu, 2013). There is an ongoing debate on the implications of increasing economic relations with China. However, the empirical literature on how BRI agreements enhance or mitigate these effects in developed and less developed countries is unclear.

The magnitude of China's effort to enhance the global economy has propelled academia to examine how economic relations with China affect industrialization. The empirical literature on the BRI has largely analyzed the impact of Chinese trade and investment on industrialization in less developed countries (Diallo et al., 2018; Miao et al., 2020; Qian et al., 2020). It is crucial to analyze both developed and developing nations due to the increasingly integrated global economy. Accordingly, it is unclear whether the participation of developed countries has exacerbated the effects of Chinese trade and investment on industrialization throughout foreign economies. I contend it is critical to analyze these effects in developed and less developed countries to obtain a more comprehensive understanding of the BRI's impact on industrialization throughout the world.

Over the last few decades, developed countries have experienced a decline in industrial employment and growth with the emergence of global production. At the same time, less developed countries have experienced industrialization. I argue that China's dominance and integration into the world economy may contribute to these contrasting trends in development. The ascension of Chinese manufacturing in the global economy through industrial upgrading and technological innovation may have induced competition with developed countries, which may increase the rate of deindustrialization for these countries. Moreover, the accelerated economic gains from infrastructure projects, industrial loans, and trade globalization can also propel less developed countries into a new industrial era. Several countries that may have reached their industrial peak in the 1970s are beginning to see the same sectors reinvigorating due to this new global network (Kruse et al., 2023). Therefore, an important consideration is whether the emergence of global production and China's economic ascension fuel these trends. Thus, the empirical question to address is: What is the effect of Chinese trade and investment on industrialization in developed and less developed countries?

However, the positive effects of Chinese-driven globalization should not overshadow potential secondary and tertiary effects on domestic economies. Are these effects an actual win-win situation? On the one hand, the BRI seems to be a repackaged 1980s globalization effort to deal with domestic overaccumulation issues that require market expansion for continuous economic growth (Hung, 2008). China's globalization effort could target emerging economies to tap into raw materials and new export markets while offshoring and outsourcing low-value industrial activity.

Alternatively, the BRI can be considered an extension of China's domestic "opening up" policy, which promotes interconnectedness, a win-win situation for all countries. These competing perspectives on Chinese trade and investment under the BRI warrant an empirical adjudication. Therefore, it is necessary to analyze the following: How has the Belt and Road Initiative affected the impact of Chinese trade and investment on industrialization in developed and less developed countries?

This thesis examines these research questions and assesses Chinese trade and investment on industrialization. Due to China's industrial upgrading, the country may offshore and outsource many labor-intensive, low-value-added segments of its manufacturing sector to less developed countries while advancing bilateral economic relations worldwide. Increasing global connectivity will allow China to tap into emerging markets and introduce relatively cheap Chinese manufactured products to foreign economies. Less developed nations may experience industrialization through reduced trade entry barriers, increased economic efficiencies, and an influx of foreign capital investment. Consequently, a highly efficient global market enables China's middle to high-end manufacturing sectors to effectively compete with other developed nations, thereby increasing their market share compared to developed nations. Undoubtedly, China benefits from tapping into emerging markets, extending to developed and less developed nations. However, this does not align with the strict win-win scenario that is currently portrayed.

This study empirically assesses these arguments using longitudinal data on 124 countries from 2001 to 2019. Based on estimates from two-way fixed-effect models, I find Chinese trade and investment exert both positive and negative impacts on the industrialization of developed and less developed countries. It benefits foreign economies by promoting growth in industrial employment and value-added while hindering industrial worker productivity. More importantly, the results show participation in the BRI amplifies these effects.

The impact of China's trade and investment has been widely discussed in the literature, particularly since the launch of the BRI in 2013. This thesis seeks to contribute to the growing literature surrounding the Belt and Road Initiative by comprehensively analyzing the effects of Chinese trade and investment on industrialization and whether participation in the BRI may amplify these effects. Given the recent development of the BRI, research should continue to analyze its effects on less developed nations. The contradictory findings surrounding whether the BRI brings a net benefit to foreign economies warrant further research. Additionally, there is a lack of research on how the BRI moderates these effects, which should prompt further investigation. This thesis advances the literature on this topic by analyzing how the BRI moderates industrialization between non-participating countries and those actively participating in BRI agreements. Extending the literature on how the BRI affects global economies is critical to understanding the effects of this global industrialization project.

The rest of this thesis is structured as follows. Chapter 2 outlines the literature related to this study and provides an overview of the hypotheses used to test the research question. Chapter 3 outlines the data and methodology used to test the hypotheses. Chapter 4 presents the regression findings and assesses the hypotheses. The concluding chapter summarizes the findings, describes the current study's limitations, and provides recommendations for future research.

Chapter 2 – Literature Review

China's recent ascension as a global economic powerhouse has sparked numerous studies scrutinizing its international involvement (Autor et al., 2014, Jenkins, 2015). This increase in industrial activities during the 1980s and beyond has significant global implications as developed nations started moving parts of the production process overseas, fostering industrialization in less developed countries. China capitalized on the wave of global industrialization by enacting economic policies that focused on improving its industrial sector through manufacturing exports. Throughout the next few decades, China shifted from cheap labor-intensive industrial activities to high-value capital-intensive industrialization. This fueled the global share of exports from China, which surged from two percent to five percent between 1990 and 2000 (Autor et al., 2014), a significant leap that positioned China as one of the largest winners in this new era of global competition.

Notably, China's domestic economic policies transformed from labor-intensive low value-added manufacturing industrial activities to focus on industrial development and industrial upgrading while pushing its opening-up economic policy (Jigang, 2020). More importantly, the Belt and Road Initiative (BRI) advances China's economic strategy by developing a global infrastructure that facilitates trade, investment, and access to emerging economies. The global share of Chinese exports further increased from 12 percent in 2007 to 16 percent in 2011 (Autor et al., 2014), solidifying China's status as one of the leading industrial nations with a 30 percent share of global gross domestic product (Zaman et al., 2021). The rigorous implementation of industrial policy and its successful rise in the world economy have made China a formidable global competitor in manufacturing.

China has continued its impressive growth into the 21st century, cementing its position as a global central economy. Its entrance into the World Trade Organization and alliance with G-20 partners expanded its global reach, shifting the balance of power to less developed nations (Hung, 2008). However, China's emergence has instigated a debate over the impact of Chinese trade and investment on industrialization in other nations. On one hand, scholars contend other countries have lost market share due to Chinese exports (Liu et al., 2018). Specifically, other countries have experienced a "China Shock" which negatively affects industrial sectors that closely compete with China (Autor et al., 2014; Donoso et al., 2015; Mion & Zu, 2013) or firms that manufacture similar products that cannot compete with China's low-cost exports (Bastos, 2020; Medina, 2024). Accordingly, Qian, Rafique, and Wu (2020) conceptualize this as "…import competition from China…a supply side shock from China" (p. 2).

The effect of the China Shock Syndrome can negatively impact development through increasing competition from cheap Chinese imports, export primarization, trade deficits, and informality in the manufacturing sector (Jenkins, 2015; Paz, 2022). As a result, this can increase unemployment within the industrial sector and drag down industrial growth. Additionally, focusing capital and growth in the primary sector steals employment and investment from the industrial sector, which can decrease long-term sustainable economic growth. Several arguments align with a pessimistic view of how Chinese trade and investment can decrease industrialization.

However, other scholars argue that Chinese competition can positively influence domestic economies through efficiency skill upgrading in the industrial sector (Mion & Zhu, 2014). Increasing trade and investment can lead to human capital development and higher productivity, two essential factors in promoting growth in the industrial sector. Scholars note that spillover effects from trade and investment activities, such as technology, education, and competition, positively influence domestic economies (Doku et al., 2017; Khordagui & Salah, 2013; Mion & Zu, 2013; Ombuki et al., 2023; Zaman et al., 2021; Zhang et al., 2019). The factors mentioned above promote a more favorable perspective on the expansion of trade and investment ties with China. The BRI can be regarded as a significant enabler in this context.

Given China's successful industrial history and its influence as a global leader through the BRI, it is crucial to analyze China's impact on the industrialization of other countries. Even with the rise of export competition, China’s large manufacturing sector and share of global exports have aided global industrialization. Through trade and investment, China’s influence and partnerships with less developed countries have considerable benefits. Additionally, the BRI aids in global connectivity efforts focused on increasing trade routes and promoting trade openness. Scholars note that these factors also positively impact domestic economies (Herrero & Xu, 2016; Jenkins & Sen, 2006; Silajdzic & Mehic, 2018; Zahonogo, 2019). Less developed countries may seem eager to capitalize on China’s expertise in the industrial sector, paving the way for long-term sustainable economic growth. This has led to roughly 151 countries participating in BRI cooperation agreements, highlighting the potential benefits for these nations.

2.1 **The Belt and Road Initiative**

The BRI is a strategic policy designed to expand China’s reach into emerging economies by increasing global trade by one to two percent. The BRI can be seen as an extension of China’s industrial transformation to expand its economic opening policy while fostering win-win ventures with world economies (Jigang, 2020). The initiative aids China’s international expansion, reaching into South America, Africa, and Europe as it continues tapping into global economies by leveraging formalized agreements.

The BRI may be the catalyst to deal with China’s domestic overaccumulation issues by solidifying trade and investment agreements with foreign partners. These agreements help participating countries develop trade and investment infrastructure that is currently absent in their countries. The Belt and the BRI enhance trade efficiency through infrastructure development, financial integration, and facilities connectivity (Wang, 2021), benefiting China as the world's top industrial exporter.

The efficiencies that China and, subsequently, the BRI bring to global economies can have a wide range of impacts. Mion and Zhu (2013) note how trade with China increases worker productivity and firm skill upgrading in Belgium. Scholars also note increased worker productivity in other regions due to China Shock, whereas in Brazil, Chinese import competition increases total force productivity in the manufacturing sector (Moreira et al., 2023). However, Chinese competition may increase informal markets, drive out domestic competition, contribute to trade deficits, and disrupt the manufacturing share of employment (Autor et al., 2014; Jenkins, 2015; Medina, 2024; Paz, 2022), factors that can contribute to deindustrialization in developed countries. The BRI could exasperate the effects of China Shock as it further develops the global network chain.

The initiative's 2013 commencement marks a pivotal shift in global trade and investment for one of the world's leading manufacturing countries. Current literature analyzes the impacts of heightened trade and investment between nations in the context of the BRI and China, yielding divergent perspectives (Holslag, 2017; Mion & Zhu, 2022; Paz, 2022). There is ongoing debate regarding how these bilateral agreements contribute to sustainable long-term economic growth, especially in less developed countries participating in the initiative. Proponents for the BRI identify positive spillover effects from Chinese trade and investment and increases in industrial employment and value-added from heightened economic activity (Mion & Zhu, 2014; Wang et al., 2020). On the other hand, a more pessimistic view holds the BRI accountable for causing deindustrialization, constricting economic growth, and fostering the primarization of foreign economies (Holslag, 2017; Jenkins, 2014).

The BRI can be conceptualized as a globalization effort mimicking the Washington Consensus from the 1980s. At this time, the United States was undergoing industrial maturation and transitioning to a global lender and service sector leader. Simultaneously, globalization practices spread as developed countries began offshoring many of the labor-intensive, low-value-added segments of the manufacturing sector to less developed countries. Similarly, during this period, China began its rise as a dominant manufacturing export country in the low-end manufacturing sectors during the 1980s and 1990s. Through the next two decades, China transitioned into middle- and high-end manufacturing sectors while remaining competitive throughout the entire industry and expanding its services industry. After initiating the BRI in 2013, China has increasingly moved many high-intensity, low-end manufacturing activities to less developed countries with lower labor costs, facilitated by the declining entry barriers in the manufacturing sector that the BRI helps to facilitate.

Naturally, China's quest for expansion into untapped markets through the BRI may have started during the 2008 financial crisis. China and the US had significant trade exposure, and the financial crisis may have indicated this interdependence, signifying a shift in China's economic policy. To curb a domestic overaccumulation problem, the BRI may be the "spatial fix" necessary to continue domestic growth (Carmody et al., 2021), whereas tapping into emerging markets and exporting the surplus capital to these emerging economies can assist in the overaccumulation issue while lowering trade exposure with the US (Hung, 2008).[1] Notably,

[1] Spatial fix is associated with the capitalist mode of production, whereas capital accumulation requires geographical space for production (Harvey, 1975). Consequently, China may be at a point where overaccumulation meets limited

China is expanding its reach through investment and trade while countries receive a massive influx of capital. Coupled with China's premier information and technology within the industrial sector, the BRI countries enjoy a wide range of spillover effects that increase efficiencies that contribute to rapid industrialization. This study advances current literature by analyzing how the BRI can affect this period of rapid industrialization among emerging economies.

Table 1 shows a list of countries actively involved with BRI agreements and the year the agreement was enacted. The primary agreements take various forms, such as Memorandums of Understanding (MoU), Memorandum of Arrangement (MoA), statements, or guiding principles that outline cooperation between participating nations and China. Secondary agreements are more specific and are nested under primary agreements that detail items such as infrastructure

Table 1: Countries of the Belt and Road Initiative and Year Entered

Afghanistan	2023	Czech Republic	2015	Latvia	2016	Portugal	2018	Uzbekistan	2015
Albania	2017	Djibouti	2018	Lebanon	2017	Qatar	2019	Vanuatu	2018
Algeria	2018	Dominica	2018	Lesotho	2019	Romania	2015	Venezuela, RB	2018
Angola	2018	Ecuador	2018	Liberia	2019	Rwanda	2018	Vietnam	2017
Antigua and Barbuda	2018	Egypt, Arab Rep.	2016	Libya	2018	Samoa	2018	Yemen, Rep.	2017
Argentina	2022	El Salvador	2018	Lithuania	2017	Saudi Arabia	2018	Zambia	2018
Armenia	2015	Equatorial Guinea	2019	Luxembourg	2019	Senegal	2018	Zimbabwe	2018
Azerbaijan	2015	Eritrea	2021	Madagascar	2017	Serbia	2015		
Bahrain	2018	Estonia	2017	Malawi	2022	Seychelles	2018		
Bangladesh	2019	Ethiopia	2018	Malaysia	2017	Sierra Leone	2018		
Barbados	2019	Fiji	2018	Maldives	2017	Singapore	2018		
Belarus	2013	Gabon	2018	Mali	2019	Slovak Republic	2015		
Benin	2018	Gambia, The	2018	Malta	2018	Slovenia	2017		
Bolivia	2018	Georgia	2016	Mauritania	2018	Solomon Islands	2019		
Bosnia and Herzegovina	2017	Ghana	2018	Micronesia, Fed. Sts.	2018	Somalia	2015		
Botswana	2021	Greece	2018	Moldova	2013	South Africa	2015		
Brunei Darussalam	2018	Grenada	2018	Mongolia	2013	South Sudan	2018		
Bulgaria	2015	Guinea	2018	Montenegro	2017	Sri Lanka	2017		
Burundi	2018	Guinea-Bissau	2021	Morocco	2017	Sudan	2018		
Cabo Verde	2018	Guyana	2018	Mozambique	2018	Suriname	2018		
Cambodia	2013	Honduras	2023	Myanmar	2016	Syrian Arab Republic	2022		
Cameroon	2015	Hungary	2015	Namibia	2018	Tajikistan	2018		
Central African Republic	2021	Indonesia	2015	Nepal	2017	Tanzania	2018		
Chad	2018	Iran, Islamic Rep.	2018	New Zealand	2017	Thailand	2014		
Chile	2018	Iraq	2015	Nicaragua	2022	Timor-Leste	2017		
China, P.R.	2013	Italy	2019	Nigeria	2018	Togo	2018		
Comoros	2015	Jamaica	2019	Niue	2018	Tonga	2018		
Congo, Dem. Rep.	2021	Jordan	2023	North Macedonia	2013	Trinidad and Tobago	2018		
Cook Islands	2018	Kazakhstan	2015	Oman	2018	Tunisia	2018		
Costa Rica	2018	Kenya	2017	Pakistan	2013	Turkey	2015		
Côte d'Ivoire	2017	Kiribati	2020	Panama	2017	Turkmenistan	2017		
Croatia	2017	Korea, Rep.	2018	Papua New Guinea	2016	Uganda	2018		
Cuba	2019	Kuwait	2018	Peru	2019	Ukraine	2017		
Cyprus	2019	Kyrgyz Republic	2013	Philippines	2017	United Arab Emirates	2018		
Dominican Republic	2019	Lao PDR	2018	Poland	2015	Uruguay	2018		

geographical space and therefore requires "Temporal deferral and geographical expansion [to] fix the overaccumulation crises that arise from the chronic tendency of capital to accumulate over and above what can be reinvested profitably in the production and exchange of commodities." (Arrighi, 2004, p. 528, brackets added).

projects or finance agreements (Wang, 2021). The agreements are found between all participating nations, whether developed or less developed. Additionally, the MoUs have five primary focus areas that include: support policy coordination, facilities connectivity, trade, financial integration, and facilitating personnel networking (Wang, 2021). In 2017, the Chinese State Council rescinded its approval authority for companies looking to invest overseas, which seemed to open the floodgates for more significant amounts of FDI into BRI-affiliated countries (Clark, 2023). These factors significantly influence trade and investment with participating countries by lowering trade and investment barriers.

The cooperation agreements can help spur economic activity and contribute to economic growth (Doku et al., 2017). Initial estimates indicated the effort to cost about 1 trillion USD in new infrastructure projects, including new ports, railways, and communication networks, with some estimates going as high as 1.7 trillion USD (Carmody & Murphy, 2022) and spans from Asia to S. America, and has most recently expanded to Equatorial Guinea in West Africa. The project covers 62 percent of the global population and 30 percent of the world's GDP (Zhang et al., 2019). This rapid increase in growth and industrialization would be otherwise unavailable without the assistance of an economic powerhouse such as China. The agreements come in various forms but are mostly trade- and infrastructure-based projects, such as railways, improved economic corridors, and ports (Adeniran et al., 2021) that theoretically benefit both countries equally.

China has seen exponential growth in its global manufacturing share and overall trade volume over the past three decades. The BRI assists in solidifying partnerships with foreign countries through formal trade agreements, expanding China’s global reach. These formal agreements are primarily investments in infrastructure and trade facilitation (Baltensburger &

Dadush, 2019). Additionally, cooperation agreements may contain roadmaps that lead to commercial loans and conditions for increasing the trade of raw materials (Grimoux, 2018). Furthermore, Liu et al. (2018) argue that China is dealing with the domestic crowding-out issue as it transitions from low to high-value-added industrial production, which the BRI alleviates by relocating labor-intensive and low value-added manufacturing industries to other countries. The ripple effect of China's trade presence can be felt throughout the globe.

As a partner, China can support countries' economic growth through better trade infrastructure (Herrero & Xu, 2016), increased trade, investment, and spillover effects of these activities. Spillover effects, for example, can be information, competition, and demonstration effects learned or gained through a trade or investment partner. The ability for countries to rapidly transform and compete on the global stage now has a platform, a roadmap, and an identified partner to assist in this process. However, scholars also find that increased trade and investment exposure can hinder industrialization in BRI countries (Adeniran et al., 2021). This can be due to increased unemployment in the manufacturing sector, a shift to manufacturing specialization, and decreased technological advances in the industrial sector. All the factors previously listed also contribute to deindustrialization.

2.2 **Industrialization in Developed & Less Developed Countries**

Industrialization is essential for the development of countries. Specifically, manufacturing industries are the cornerstone that drives economic development (Pandian, 2016; Rodrik, 2014). The manufacturing sector, a subsector within the industrial sector, is resistant to domestic turmoil, providing a stable way to increase employment and gross domestic product (GDP) (Rodrik, 2018). The industrial sector, which includes manufacturing and construction, represents a significant portion of an economy's GDP and employment. It can influence nonmanufacturing sectors' growth rate and productivity through backward and forward linkage effects and technology diffusion (Cornwall, 1977). Therefore, consistent growth in this sector can serve as a critical indicator of the overall health of an economy.

There is a strong emphasis on the industrial sector being the most critical for maintaining steady employment and GDP growth. Kruse et al. (2023) utilize the manufacturing share of employment as a dependent variable in their equation to test theories on the de-industrialization phenomenon, maintaining the importance of the industrial sector on economic growth. Additionally, Haraguchi et al. (2017) find no evidence of decreasing importance in the manufacturing and industrial sectors by analyzing manufacturing value added as a percentage of GDP. Furthermore, Pandian (2016) finds that manufacturing share of employment positively affects economic growth. These studies prove that manufacturing remains a critical growth sector in less developed nations.

Industrialization is characterized by an inverted U-shaped pattern (Alderson, 1999). Developed countries experienced industrialization during the first half of the 20^{th} century. Starting in the 1970s, these countries started to experience deindustrialization with the transition to services and finance. As deindustrialization occurs, the transition into the services sector ideally absorbs the increased unemployment from industry. Even with a decrease in the overall manufacturing share of employment, this natural progression of deindustrialization indicates a positive economic trajectory.

Less developed countries, on the other hand, show increases in industrialization during the latter half of the 20^{th} century and the first decades of the 21^{st} century. These countries are currently absorbing low-end manufacturing activities from the global North due to large pools of cheap labor and declining entry barriers (Pandian, 2016) relative to developed nations brought on by the emergence of global value chains and the globalization of the world economy (Rodrik, 2018). Additionally, the shift from agricultural and primary sector industries (i.e., raw material extraction) to urban industrial productivity and the technological advances that come with industrial expansion facilitates stable economic growth. This upswing in industrial activity and increasing manufacturing share of employment remain critical factors in economic growth for less developed nations.

The current landscape of industrialization in global economies is influenced by global value chains (GVC). Fragmentation, characterized by splitting the production of items into segments, can decrease costs associated with manufacturing production (Yang & Lin, 2021). Fragmentation enables developed countries to divide the production chain and offload segments of the manufacturing process to less developed nations, taking advantage of lower production costs in foreign countries (Rodrik, 2018). This process helps facilitate deindustrialization in developed countries that outsource production, whereas less developed countries benefit from increased industrialization.

Taking this initial cost-cutting division of labor and adding the total value from each segment creates a product's global value chain (GVC) (Timmer et al., 2015). In economies increasingly focused on exports, Rodrik (2018) contends that GVCs undercut industrial worker productivity when countries import inputs required for the production process. Roberts (2021) advances this pessimistic view of GVCs and finds that "…the global integration of southern firms is associated with a decline in the proportion of skilled workers in the industrial labor force" (p. 16). Feenstra (1998) also agrees that GVCs and this new era of globalization can harm economies by increasing wage inequalities and jeopardizing the economic position of low-skilled workers. Overall, while GVCs can cut production costs and spur economic activity, secondary and tertiary effects associated with a fragmented production process can harm developed and less developed countries.

China takes advantage of lower production costs and upgrades its industrial sector by leveraging GVCs in its favor. China's final product exports to European Union (EU) countries increased after implementing the BRI. In contrast, exports of final products to Asian countries decreased, while exports of parts and equipment to other Asian countries increased (Yang & Lin, 2021). This switch may signal that China is offloading segments of the production process to foreign economies with lower production costs. This could increase competition with EU markets and trade dependency amidst less developed nations, showcasing how GVCs may affect industrialization in developed and less developed countries.

Due to China's ascension into a global manufacturing leader over the last few decades, competition shocks are felt throughout world economies as countries that produce similar goods are unable to compete with cheaper Chinese goods (Autor et al., 2014; Darko et al., 2021; Medina, 2024). In particular, China has enacted an industrial policy promoting middle to high-end segments of the manufacturing industry while maintaining a strong position in the low-end segments of the sector (Jigang, 2020). Notably, this increases industrial competition in developed countries that target segments with long histories of quality and price competition in high-end industrial products.

As for less developed countries, it is unclear how Chinese trade has impacted industrialization. For example, Jenkins (2015) continues the pessimistic view of Chinese competition in Brazil by exploring how it increases the primarization of exports, contributes to trade deficits, and increases competition in foreign markets. This complements the perspective that China is engaging in what Holslag (2017) describes as "offensive mercantilism". In this strategy, China is increasingly entering foreign markets traditionally dominated by EU nations in terms of large export share of high-end products. China Shock syndrome paints a pessimistic view of the effects of Chinese trade and investment on industrialization in the global economy.

Figure 1 depicts time trend data on the three indicators of industrialization used in this study: the size of the industrial force, the size of the industrial sector, and industrial worker productivity. The time trend data shows these indicators beginning one year after the BRI's initiation. Interestingly, the size of the industrial force and the size of the industrial sector remain relatively constant throughout this time, even though there is a global influx of capital promoting trade and industrialization among less developed economies. Additionally, there is a significant increase in industrial worker productivity since the commencement of the BRI among all countries in this study, potentially attributed to global economic integration and an influx in industrialization activities.

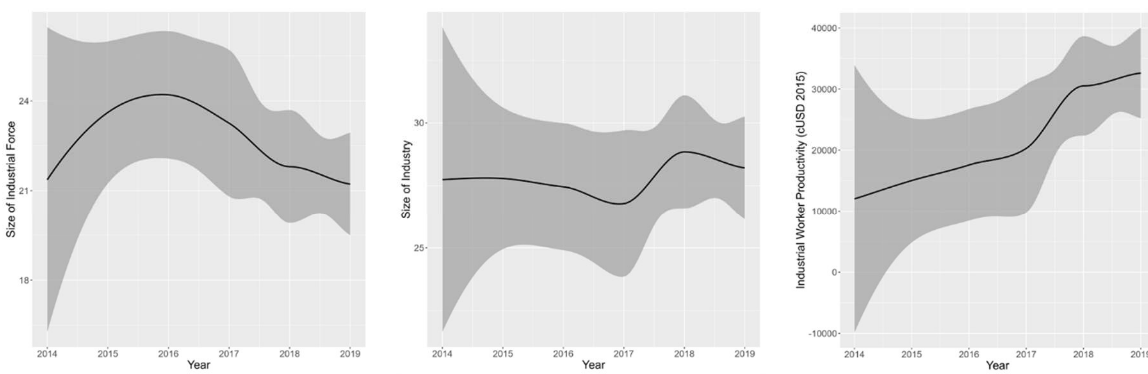

Figure 1: Locally Weighted Time Trends of Industrialization

While scholars maintain that manufacturing and industrialization are vital components of economic success (Pandian, 2016, Rodrik, 2018), shifts within the sector can occur and still maintain healthy growth. However, this may only apply to countries that can improve worker productivity in this sector. Yang and Lin (2021) find shifts in machinery production networks following the BRI implementation, highlighting that parts and equipment exports increased to

Asian countries while final products to Asian countries dropped but increased to Europe. This shift in downstream industrial activities from China would lower industrial worker productivity owing to the labor intensive, low-value-added industries.

Conversely, Mion and Zhu (2013) find that Chinese trade increases industrial sector efficiencies in Belgium, promoting higher worker productivity as the country shifts into capital-intensive production. This also occurred throughout the 20th century as the US switched from manufacturing to finance and services while promoting the Washington Consensus and industrial globalization (Arrighi et al., 2003). This shifted many labor intensive jobs overseas while maintaining a healthy industrial sector, increasing worker productivity due to technological advances and sectoral improvements.

2.3 **Chinese Trade & Industrialization**

The literature on the effects of trade openness on industrialization is mixed (Asamoah et al., 2019; Borojo & Jiang, 2016; Musila & Yiheyis, 2015). On one hand, trade openness can facilitate industrialization in less developed countries through spillover effects, cheaper goods, increasing exports, and decreasing transportation costs, benefitting certain countries and regions (Asamoah et al., 2019; Jenkins & Sen, 2006). However, research shows that trade openness may decrease productivity, employment, and GDP (Borojo & Jiang, 2016; Jenkins & Sen, 2006; Musila & Yiheyis, 2015), and trade barriers can contribute to increased economic growth (Silajdzic & Mehic, 2018).

Figure 2 presents the time trends of Chinese trade with developed and less developed countries from 2014 to 2019. This period is important because it is one year after the inauguration of the BRI. Average manufacturing imports from China among all countries have seen a decrease over time. This may be attributed to China's industrial upgrading as it shifts into exporting middle—to high-end manufacturing products.

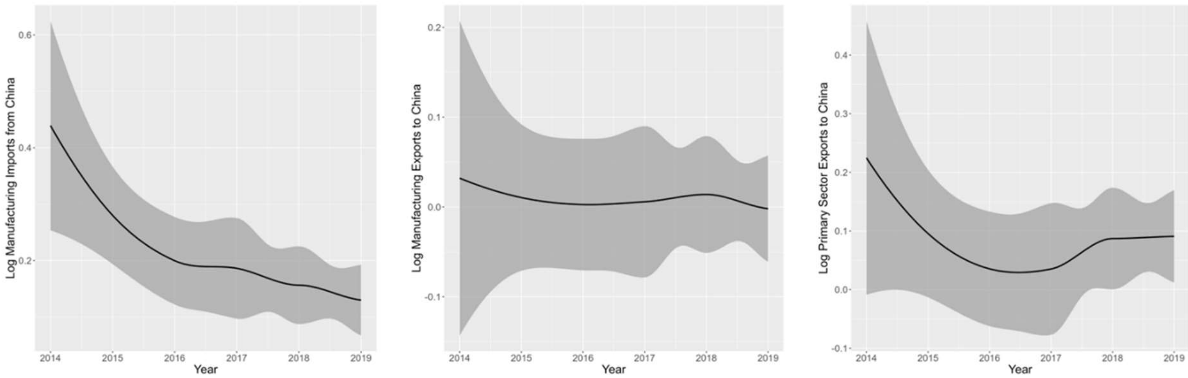

Figure 2: Locally Weighted Time Trends of Chinese Trade

Manufacturing exports to China remained relatively unchanged throughout this period. This trend could be due to China's offshoring and outsourcing of low-value-added segments of its manufacturing sector, which decreases the amount of input needed for China's domestic manufacturers. Additionally, China's progress through industrial upgrading and its focus on middle—to high-end industrial production may only be importing products closer to the final stage, reducing the volume of imports from foreign economies.

Interestingly, primary sector exports to China from all countries dropped and gradually increased starting in the latter half of 2016. This may be attributed to the recent expansion of the BRI to include regions beyond Asia that export primary sector materials. As the leader in global energy consumption, China may be leveraging the BRI to tap into emerging economies' primary sector to satisfy its domestic energy demand. The economic nature of BRI agreements, several infrastructure development projects nearing completion, and foreign countries orienting economies to the primary sector can contribute to the increase in primary sector exports seen in these trends.

The trends in Chinese trade with developed and less developed countries depict an interesting picture of its integration with new trading partners under the Belt and Road Initiative and current trade with global economies. China, as the leading export country, leverages its extensive trade network to access emerging economies and intensify competitive pressure with developed countries. This can have positive and negative consequences on foreign economies' industrialization as China expands its opening-up policy and further entrenches itself in global trade networks.

Chinese manufacturing trade should affect industrialization in several ways. On the one hand, China's development as a global leader in the industry may have increasingly negative implications for the industrialization of other countries. Autor et al. (2014) find that increased competition with Chinese imports reduced employment in US manufacturing firms. Notably, imports from China negatively affect manufacturing industries' employment via competition shocks (Bastos, 2020; Donoso et al., 2014; Moreira et al., 2023). Increases in imports from China create competition in which firms are unable to compete with low-cost imports.

Additionally, industrial upgrading in China throughout the past two decades has increased competition with developed countries in high-end industries under the industrial sector. Interestingly, Siladjzic and Mehic (2018) find that increased trade barriers positively relate to economic growth in European nations. Surprisingly, Yang and Lin's (2021) findings show that Chinese exports of final products to Europe outpaced those of parts and equipment to Asian nations. This may enhance the effects of deindustrialization in developed countries because China is shifting focus to new markets, with higher quality products that now closely compete with highly industrialized nations.

Furthermore, decreasing entry barriers due to rising global export competition and searching for other cost-effective measures within the production process could contribute to premature deindustrialization in less developed countries (Pandian, 2016). Generally, less developed countries leverage relatively cheap labor costs to compete in the industrial sector. Even as China progresses in industrial upgrading, it remains competitive even in the low-end segments of the industrial sector (Brandt & Thun, 2010). These factors contribute to the negative impact of Chinese trade on industrialization.

Manufacturing imports can affect the size of industrial sector due to import competition, increasing trade deficits, and promoting trade within an economy's primary sector. Scholars note that firms that share high competition with China struggle with China trade shocks (Darko et al., 2021; Medina, 2024), and some regions rely on small firms as they contribute to large shares of employment growth (Esaku, 2022). Research also shows that smaller and inefficient firms are unable to compete due to competition for cheaper goods (Medina, 2024), further exacerbating unemployment within the industry and decreasing the size of the industrial sector. Moreover, Oluwatoyin and Folasade (2014) find that increased trade openness does not significantly impact economic growth, supporting the view that increasing import trade negatively affects global economies. Musila and Yiheyis (2015) find that policy-induced trade openness negatively affects GDP. If foreign economies do not have specific policies or trade barriers, they may lose out to Chinese competition in their domestic markets.

Chinese imports can also harm worker productivity due to the massive influx of cheaper manufactured goods (Ben Mim et al., 2021; Borojo & Jiang, 2016), straining domestic firms, which may cause deterioration in technological advancements the manufacturing sector traditionally brings. Specifically, China may import final-stage and high-technological goods (Grimoux, 2018; Yang & Lin, 2021; Yu et al., 2019) while offshoring and outsourcing labor-intensive and low-value industries of the manufacturing process. These factors can limit worker productivity and potentially stall economic growth.

However, Borojo and Jiang (2016) find that increased trade openness does not increase force productivity. In contrast to the pessimistic view of Chinese import effects on industrialization, Mion and Zhu (2013), Darko, Occhiali, and Vanino (2021), and Moreira et al. (2023) find that increased Chinese trade leads to higher productivity; however, also note the adverse secondary effects from import competition on domestic employment. Friesenbichler, Kügler, and Reinstaller (2024) find that Chinese trade initially increased worker productivity, supporting prior studies, but negatively affected productivity after the 2008 global financial crisis due to industrial upgrading. Overall, this pessimistic view of Chinese import competition effects on the industrialization of other countries suggests the following:

H_1: Manufacturing imports from China decrease industrialization.

Apart from China trade shocks, trade dependency can also influence a country's industrial sector. Studies show that trade exposure with China is rising (Raghavan & Devadason, 2020), and economic cooperation continues despite regional tensions (Zhao, 2019). Export-oriented sectors can positively impact domestic economies where growth in export-oriented firms can lead to higher employment, attributed to trade openness (Qian et al., 2020; Were, 2011) and more robust economic growth (Zahonogo, 2019). For example, Bastos (2020) finds that countries with specializations different from those in China are more resistant to trade shocks. Therefore, exports to China and other regional partners are unaffected by competition shocks. This can contribute to sustainable growth without worrying about price fluctuations and trade shocks from a leading partner. Put simply, manufacturing exports to China can boost the economy's GDP by increasing the number of exporting firms. Notably, there is a resurgence in global industrialization (Kruse et al., 2023), which can be attributed to China’s stimulus of global trade. This boost in trade volume can lead to increases in the overall size of the industrial sector.

Similarly, increases in exports with China as a leading trading partner can influence industrial worker productivity. Studies show that trade spillover effects can positively affect industry through technology, human capital, or process improvement (Ombuki et al., 2023). These factors suggest that the effects of export trade may only now be starting to impact domestic economies, which are noted to increase productivity and contribute to GDP growth (Silajdzic & Mehic, 2018). Overall, exports positively affect industrialization with growth in industrial employment, the size of the industrial sector, and industrial worker productivity, supporting the following hypothesis:

H_2: Manufacturing exports to China increase industrialization.

At the same time, as China continues to expand its manufacturing trade globally, countries have increased raw material exports to China (Adeniran et al., 2021). For example, Grimoux (2018) finds that increased raw material exports to China are necessary for the BRI to accommodate its domestic overaccumulation issue. China is still the number one energy importer (Enerdata, 2024). Despite domestic economic policies to curb energy consumption (Jigang, 2020), raw materials must feed into its industrial sector to feed its domestic production. Jenkins (2015) notes that primary sector goods have increased in export share in Brazil and Latin America since 2002. This shift may orient foreign economies to focus on the primary sector, displacing employment in the industrial sector and contributing to deindustrialization.

Moreover, China is the leading net energy importer and an extensive parts and machinery manufacturer that requires increased raw materials. China has increasingly accessed the primary sectors of emerging markets through trade and the development of the BRI, which would otherwise be inaccessible. This high concentration of primary sector imports to China may lead domestic economies to prioritize primary material extraction over expanding the manufacturing sector. Scholars note that multinational investment in the primary sector has increased, which is favorable for the economy (Gu et al., 2016). The expansion of the primary sector does not yield robust economic growth in comparison to the industrial sector.

Additionally, this growth in the primary sector may have secondary effects on the growth of the industrial sector through technology diffusion and increased domestic GDP (Gu et al., 2016). However, the impact of focusing on the primary sector has minimal long-term growth, whereas scholars support the manufacturing sector as an engine for consistent economic growth (Rodrik, 2014). Consequently, Rodrik (2017) finds that concentrating on the primary sector reduces the importance of manufacturers and supports or even magnifies the consequences of deindustrialization. Jenkins (2015) furthers this argument and comments on the increased primarization of Brazil and Latin American countries, which can lead to decreased industrial productivity and consequently support deindustrialization. Additionally, it's worth noting that investment in the primary sector can have a detrimental effect on the manufacturing sector (Kaya, 2010), resulting in domestic economies shifting their focus away from industrial activities. These reasons support the following hypothesis:

H_3: Primary sector exports to China decrease industrialization.

2.4 **Chinese Investment & Industrialization**

Chinese investment has grown as more countries participate in the BRI. For example, Lv, Arnoldi, and Villadsen (2022) show that multinational corporations' investment has increased alongside the growth of the BRI, but the level of investment remains constant compared to before the BRI. However, Chinese investment has risen six to 10 times since 1998, only recently tapering off the past two years (CEIC Data, 2024). Additionally, after the BRI's inauguration, Chinese investment grew after the state lifted approval restrictions on foreign contracts.

Figure 3 depicts Chinese foreign direct investment (FDI) a year after the commencement of the Belt and Road Initiative (BRI). This average trend supports Lv, Arnoldi, and Villadsen's (2022) findings that investment in China has remained relatively stable since 2014. However, the time trend shows an average decrease in inward FDI stock from China among all countries.[2] This decrease could be due to China reallocating investment to BRI-affiliated countries, away from those not participating in official BRI agreements. This redirection of investment may signal China's effort to take advantage of low-cost foreign labor and rising interest in resources seeking investment opportunities, supporting China's going-out policies (Carmody & Murphy, 2022). Research shows that China has increased investment in sectors characterized by domestic overcapacity issues (Nugent & Lu, 2021), supporting the claim that China is searching for cost-cutting measures in the production process. Foreign investments help offset domestic surplus capital and can boost material exports and raw material imports.

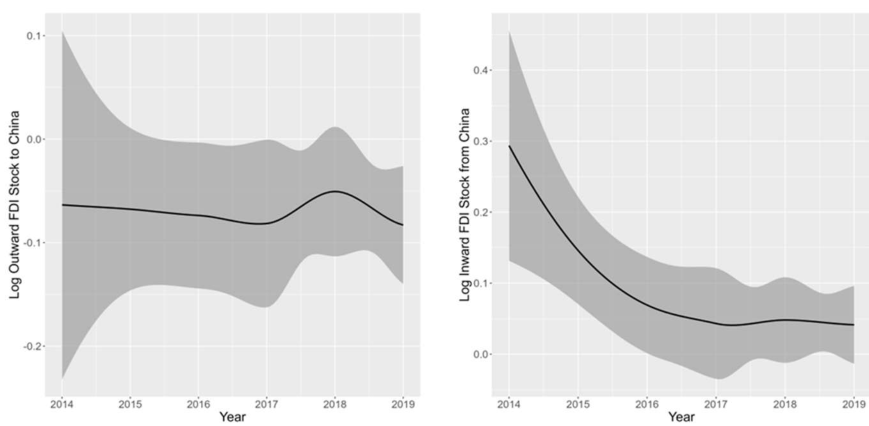

Figure 3: Locally Weighted Time Trends of Chinese Investment

Multinationals are highly interested in tapping into emerging economies to expand their consumer base (Wolf, 2016). Equally, foreign-based multinational enterprises utilize foreign

[2] Inward FDI stock is measured as the foreign investor's value of equity and loans of multinationals in a foreign country. In contrast, outward FDI stock is the resident's equity and loan values in a foreign economy (Steenbergen et al., 2022).

direct investment to seek resources, new assets, and production efficiencies (Dunning, 2000). China's motivation to invest in foreign economies is to offload sectors characterized by domestic overproduction and pollution issues (Nugent & Lu, 2018). Specifically, offshoring its labor-intensive, low-value-added manufacturing industries to cooperating nations is a win-win situation for both parties as it can boost industrialization in less developed countries while satisfying domestic corporations. This is in addition to expanding into emerging markets that were otherwise unavailable.

Additionally, China's interest in developing cost-efficient trade infrastructure and exploiting foreign primary sectors is noted in recent literature (Du & Zhang, 2018). China may invest in Belt and Road nations to circumvent trade sanctions, alleviating costs associated with competition while tapping into emerging markets (Zhu et al., 2023). The recent wave of globalization has led to an increase in global foreign direct investment (FDI), which can impact the industrialization of countries. However, competing perspectives acknowledge that FDI can benefit or inhibit industrialization, as discussed in the following section.

FDI can have considerable benefits among partnering nations. These activities can spur economic growth due to spillover effects from the more developed nations, which range from competition, informational, technological, and administrative effects dispersed from an experienced organization to a developing one. For example, Diallo, Luan, and Diallo (2018) find that Chinese inward FDI contributes to increased overall GDP, shedding a positive light on the effects of foreign investment. Scholars have observed that inward FDI flows can improve industrial worker productivity through spillover effects (Ombuki et al., 2023) and help improve management, trade efficiencies (Orlic et al., 2018), and processes which lead to higher worker productivity in receiving nations (Borojo & Jiang, 2016). Higher productivity is a critical contributor to growth in the industrial sector, especially in less developed countries that are progressing through industrialization. Rapid worker productivity increases can prevent less developed nations from deindustrialization (Rodrik, 2017). While detriments to FDI through competition spillovers can strain domestic economies (Ombuki et al., 2023), countries benefit through other mediums. Overall, foreign direct investment positively affects industrialization in world economies and supports the following hypothesis:

H_4: Inward FDI stock from China increases industrialization.

However, capital dependency theorists claim that foreign capital penetration - the extent to which transnational corporations dominate a host country's economy - has negative long-term implications on economic growth (Kentor & Boswell, 2003). When considering transnational corporations, they may not always employ a local workforce, and their profits are not reinvested back into the domestic economy, unlike domestic companies. For example, Dixon and Boswell (1996) find that capital penetration creates negative externalities by diverting resources outside domestic economies, causing rifts in the domestic economy by promoting overurbanization, sectoral imbalance, and income inequality.

As China expands its reach into BRI countries, Chinese multinational corporations seek ways to capitalize on newfound partnerships by investing in manufacturing, construction, infrastructure, and trade (Zhu et al., 2023). Drastic increases in FDI can disrupt domestic economies, hindering economic growth (Miao et al., 2020). This could lead to what Kentor and Boswell (2003) describe as foreign investment concentration, where foreign investment is concentrated with one partner, which decreases long-term economic growth. Additionally, multinational corporations may hinder the ability of domestic firms to expand as competition shifts towards more efficient and effective corporations that provide similar services (Kinuthia, 2017), taking away capital and profits from domestic businesses. Kaya (2010) also presents a pessimistic view, finding that FDI in the primary sector negatively impacts employment in the manufacturing sector. Overall, multinational corporations and foreign investment can also hinder economic growth and deter domestic investment, which suggests the following hypothesis:

H_5: Inward FDI stock from China decreases industrialization.

FDI into China can also influence industrialization. Alderson (1999) argues that outward FDI decreases manufacturing employment as companies invest overseas, replacing domestic firms. Developed companies that seek to reduce costs associated with the production process amplify the effects of deindustrialization. Additionally, multinationals investing in China must seek cost-cutting measures to compete with domestic China, which may contribute to seeking cost efficiencies within the existing global value chain (Brandt & Thun, 2010). Cost-cutting initiatives implemented within the GVC can accelerate deindustrialization by reducing production costs and limiting the potential profitability of countries in the early stages of industrialization. Bilateral FDI can assist with industrial sector growth due to FDI spillover effects gained from operating in a foreign country, which include cutting production costs and gaining entry into a large overseas market. Consequently, FDI can replace domestic labor with cheaper foreign labor (Alderson, 1999). This evidence supports the following hypothesis:

H_6: Outward FDI stock to China decreases industrialization.

2.5 The BRI & Impacts of Chinese Trade and Investment on Industrialization

The Belt and Road Initiative (BRI) is an effort developed by China that reinvigorates the old Silk Trade routes throughout Asia and Europe while expanding into Africa and South America. BRI agreements come in two folds, primary and secondary, facilitating trade and investment between participating countries. These agreements extend China's domestic policy of integrating itself into the world economy and stimulating global trade. The agreements are strategically geared towards mitigating trade, investment, and capital barriers through the formalization of trade, facilities connectivity, and financial integration, all of which are economically focused (Wang, 2021). The execution of the secondary agreements is what we generally see as outputs of BRI agreements. These agreements outline construction projects, such as those throughout Kenya, Ethiopia, and Djibouti.

Figure 4 shows the average differences in three indicators of industrialization between BRI and non-BRI countries. The size of the industrial force and the industrial sector appear to be similar between BRI and non-BRI participating countries, based on the first two indicators of industrialization. However, when it comes to industrial worker productivity, there is a significant decline in worker productivity compared to non-BRI participating countries. The difference in Figure 4 can be attributed to China's offshoring of specific manufacturing sectors and its focus on primary sector imports. This sparks an interesting debate regarding the impact of the BRI on industrial worker productivity when comparing Figure 4 to Figure 1, in which Figure 1 shows an increase in worker productivity among all countries

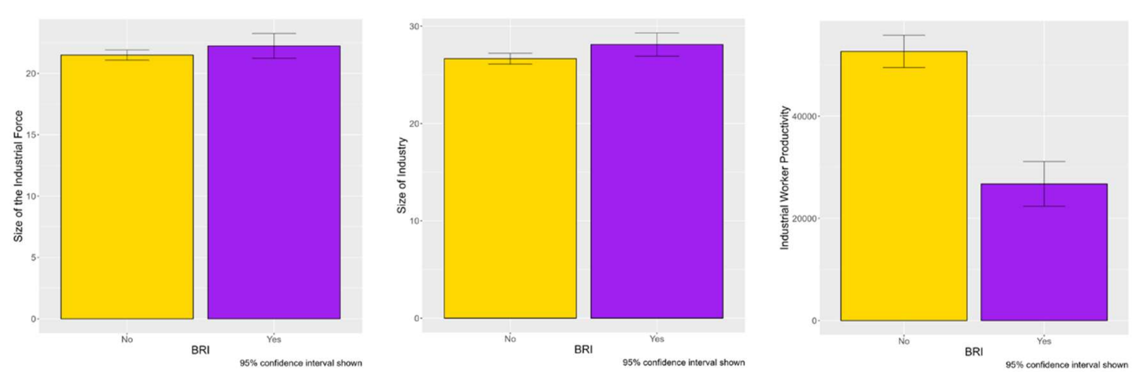

Figure 4: Mean Differences of Industrialization

Figure 5 depicts differences in Chinese trade between non-BRI countries and countries in a BRI agreement with China. The first panel shows the differences in manufacturing imports from China between BRI and non-BRI countries. This shows a drastic increase in imports from China in participating BRI nations compared to non-BRI participating countries. This could be due to the BRI bilateral trade agreements, which make it more efficient and cost-effective for China to export to these economies. Manufacturing exports to China appear to have similar levels in BRI and non-BRI countries.

The last panels depict manufacturing and primary sector exports to China. Manufacturing exports to China vary significantly in BRI countries, although showing minimal differences between BRI and non-BRI participating countries. This suggests that countries are not sending high-valued goods to China. The last panel shows primary sector exports from BRI and non-BRI participating countries. Countries with a formal BRI agreement export primary sector goods to China significantly more than non-BRI countries. The evidence suggests that China is focusing on raw material extraction and prioritizing the primary sector of foreign economies rather than promoting industrialization. This may help explain the increase in exports in the primary sector to China, starting towards the end of 2016, as shown in Figure 2, given that the average year of joining the BRI is 2017. The mean differences between non-BRI and BRI participating countries raise interesting questions on how BRI agreements moderate bilateral trade.

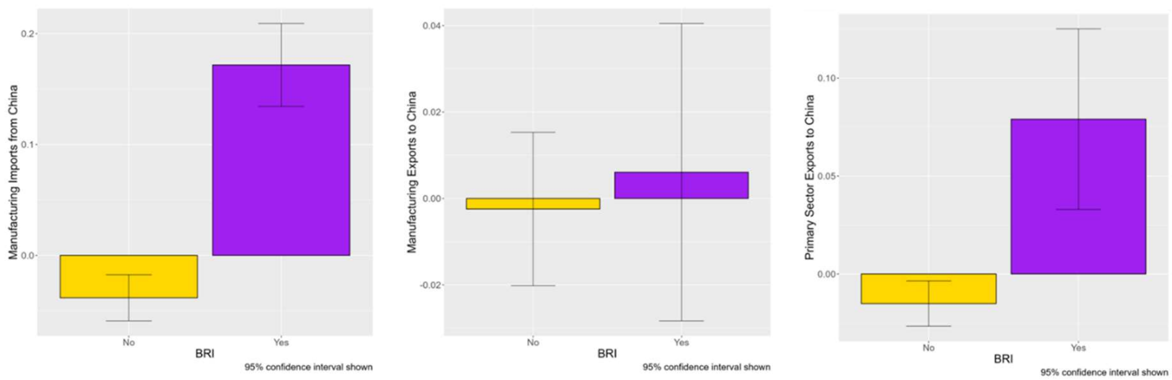

Figure 5: Mean Differences of Chinese Trade

Figure 6 illustrates the average differences in Chinese investment between countries participating in BRI agreements and those not involved in the initiative. Notably, BRI-participating countries invest significantly less than those outside the BRI umbrella. This could signal that China's selection of BRI participants mainly consists of less developed countries with limited capacity for foreign investment. This may explain why inward FDI from China is significantly higher among BRI participating nations than non-BRI countries. Comparing Figure 6 to Figure 3, China may be reallocating investment to BRI countries while decreasing investment in non-BRI countries. This could explain the decrease in inward FDI stock from China among all countries, as depicted in Figure 3. The BRI can enhance the bilateral investment relationship by improving trade and investment relations with China. This allows China to access investment opportunities with identified BRI partners easily.

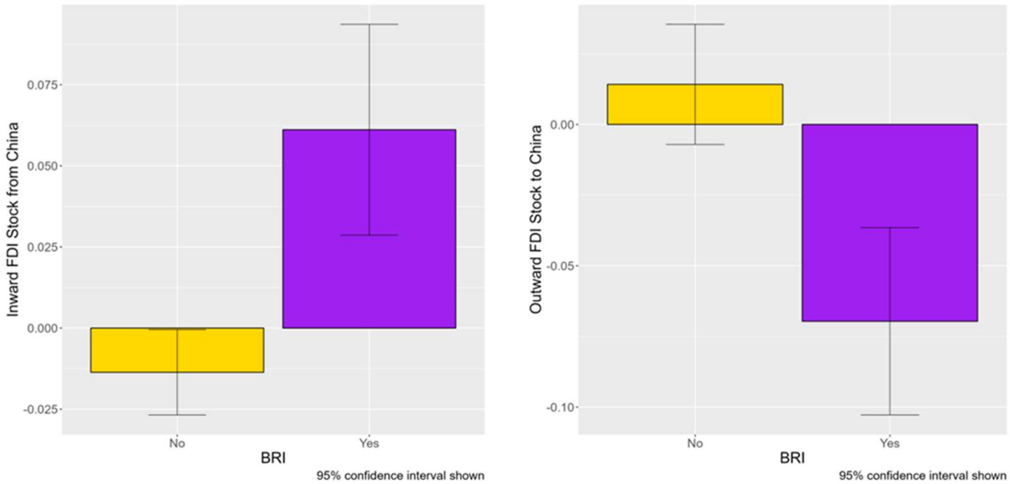

Figure 6: Mean Differences of Chinese Investment

Additionally, trade integration will help reduce capital barriers, lowering the cost of production throughout the network. Interestingly, Hererro and Xu (2017) find that lowering transportation costs significantly promotes international trade and projects, and such reductions greatly benefit European Union countries, advancing a positive view of the BRI on developed countries. Figure 6 also suggests that BRI agreements reduce capital barriers, allowing increased capital inflows from China. However, increasing trade efficiencies and reducing capital barriers potentially support increased capital inflows to primary sectors, exacerbating deindustrialization's effects, as Rodrik (2017) notes. Due to the economic nature of BRI agreements, the size and connectivity the BRI brings globally, and the reduction in trade and capital barriers, the BRI should exacerbate any effects of Chinese trade and investment on industrialization and derive the following hypothesis:

H_7: The effects of Chinese trade and investment are amplified in BRI countries.

Chapter 3 - Methodology

This chapter delves into the methodology employed to assess the effects of Chinese trade and investment on industrialization in developed and less developed countries and whether participation in the Belt Road Initiative agreement conditions these effects. The study investigates the impact of Chinese trade and investment on three indicators of industrialization to provide a comprehensive understanding of Chinese influence on industrialization. Specifically, industrialization is measured in three ways: (1) industrial employment as a percent of total employment, (2) size of the industrial sector as a percent of GDP, and (3) industrial worker productivity.

This study utilizes panel regression to model the effects of Chinese trade and investment on each of the three indicators of industrialization. A panel regression modeling approach is advantageous because it can analyze large quantities of non-randomized time series data while accounting for unobservables that may correlate with identified variables (Halaby, 2004). Specifically, a fixed-effects panel regression model, such as the one used in this study, "eliminate[s] the possibility of spurious causality" (Babones, 2009, p. 104, brackets added) due to unobservables within the data. This increases internal validity, allowing users to estimate causal effects from the data (Halaby, 2004).

Furthermore, this study utilizes an innovative measurement strategy for Chinese trade and investment. Specifically, the study draws on five indicators to measure the impact of Chinese trade and investment on industrialization: manufacturing imports from China, manufacturing and primary exports to China, inward foreign direct investment from China, and outward foreign direct investment to China. Each of these indicators is described below. The variables used in this study encompass various economic sectors, such as manufacturing and construction, that help conceptualize the sectors a domestic economy leverages to increase industrial output and contribute to economic growth.

3.1 Sample

The period of observation used for this sample is between 2000 and 2023. This timeframe is necessary because the sample contains China's ascension into the World Trade Organization (WTO), its rise as a global manufacturing leader, into the most recent year in China's ongoing global trade and investment initiative. This study's initial data sample contains 200 countries with 6,883 country-year observations from the United Nations (UN) Commodity Trade Statistics Database (2024). This thesis also uses a Harmonized Bilateral FDI dataset containing 588,058 country-year observations on Chinese inward and outward bilateral FDI data. A separate dataset identifies 147 BRI participating countries and accounts for countries' entrance and ongoing participation in a BRI agreement (Nedophil, 2023).

The process of listwise deletion reduced the number of country-year observations. After merging the COMTRADE, Bilateral FDI, and the World Bank indicators datasets, there were 6,314 country-year observations. The sample contained duplicate and missing data. After listwise deletion of duplicate and missing data, the sample contains 124 countries from 2001 to 2019, including 46 countries not participating in the BRI and 78 countries with agreements under the BRI. The total number of country-year observations in this study is 1355.

3.2 Indicators of Industrialization

This section will describe the industrialization indicators for this thesis. Industrialization is a significant indicator of domestic economic growth for countries. Haraguchi et al. (2017) and Pandian (2016) contend that the manufacturing industry's significance remains unchanged as a critical sector in less developed countries' economies. Notably, measuring industrialization includes the manufacturing sector. Measuring this sector allows researchers to gauge how healthy a country's economy performs compared to its peers. For these reasons, this thesis analyzes three main dependent variables as indicators of economic growth: industrial employment, size of the industrial sector, and industrial worker productivity.

The first dependent variable is industrial employment as a percentage of the total labor force. Data on industrial employment is drawn from the World Bank (2024) Development Indicators (SL.IND.EMPL.ZS). This variable measures a country's share of the total employment in the industrial sector as a percentage of the total labor force. World Bank (2024) defines employment as "persons of working age who were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a job, or to working-time arrangement." Additionally, the industrial sector includes jobs from several sections of the economy, such as manufacturing, mining, construction, and public utilities, and assists in identifying shifts in employment trends (World Bank, 2024). This variable enables the analysis of the industrial sector rather than focusing on individual industries.

The second dependent variable is the size of the industrial sector as a percentage of gross domestic product (GDP). Data on the size of the industrial sector is drawn from the World Bank (2024) Development Indicators (NV.IND.TOTL.ZS). This variable measures the total industrial sector's value added as a GDP. The World Bank (2024) defines value added as "the net output of a sector after adding up all outputs and subtracting intermediate inputs." The size of the industry as a percent of GDP takes value added from mining, manufacturing, construction, electricity, water, and gas sectors (World Bank, 2024). This variable provides data on a leading percent share of a country's GDP, where an increase in the size of the industrial sector will significantly contribute to GDP growth.

The third dependent variable is industrial worker productivity. Data on productivity is drawn from the World Bank (2024) Development Indicators (NV.IND.EMPL.KD). This variable measures the value added per worker in the industrial sector. The World Bank (2024) defines value added as "the net output of a sector after adding up all outputs and subtracting intermediate inputs." This variable is measured in constant 2015 United States Dollars (USD) to account for variances in inflation. This is a fundamental indicator of a more efficient workforce, and a rise in worker productivity can reduce poverty and create a healthier, stable workforce (World Bank, 2024).

3.3 Belt and Road Initiative Agreements

This thesis analyzes how Chinese trade and investment affect industrialization in other countries. The Belt and Road Initiative (BRI) is a relatively new effort to increase global trade, revitalizing the old Silk Road trade routes. The BRI has expanded into Africa, Southeast Asia, The Middle East, Europe, and South America. The current study aims to contribute to the existing literature by comparing the impact of Chinese trade and investment on industrialization in BRI and non-BRI countries.

There are roughly 147 countries currently participating in the Belt and Road Initiative with the year the country signed a Memorandum of Understanding (MoU) with China (see Table 1). The MoU signifies the official agreement and partnership between China and the participating country. This data is sourced from the Green Finance and Development Center, which compiles a list of formalized MoUs signed between BRI-participating nations and China.

3.4 Indicators of Chinese Trade

This thesis uses a variety of indicators to describe trade between a given country and China. China's rise as a leading export and import country transformed global economic chains. Scholarship remains mixed about how Chinese trade impacts countries' economies (Autor et al., 2014; Bastos, 2020; Borojo & Jiang, 2016; Darko, 2021; Donoso et al., 2020; Jenkins & Sen, 2006; Medina, 2024; Qian et al., 2020; Zhao, 2019). The current research examines the influence of Chinese trade on domestic economies and the extent to which the Belt and Road Initiative (BRI) shapes these dynamics.

The first indicator of Chinese trade is total manufacturing imports from China as a percentage of GDP. Data on manufacturing (SITC Rev.2 5-8) imports is drawn from the UN COMTRADE (2024) database. Imports from China can affect countries differently as they can substitute or complement domestic industrial activity. Scholars find spillover effects from Chinese imports may improve efficiencies and increase worker productivity (Mion & Zhu, 2013). However, the scholarship notes that imports from China can strain domestic competition, especially those specializing in similar manufactured goods (Darko et al., 2021; Medina, 2024), and restrict manufacturing employment growth (Moreira et al., 2023; Qian et al., 2020). This variable is a percent of GDP in current USD multiplied by 100 to represent total imports. The manufacturing imports variable is log-transformed for univariate normality and interpretability.

The second indicator of Chinese trade is manufacturing exports to China as a percentage of GDP. Data on manufacturing (SITC Rev.2 5-8) exports was drawn from the UN COMTRADE database. Exports to China depict how much a given country leverages China as an export partner, which can increase domestic employment and boost GDP. Qian et al. find that exports to China significantly increase domestic employment in the industrial sector (2020). This variable is a percent of GDP in current USD multiplied by 100 to represent total exports. The Manufacturing exports variable is log-transformed for univariate normality and interpretability.

The third indicator of Chinese trade is primary sector exports to China as a percentage of GDP. Recent literature emphasizes that China continues to increase imports of primary sector goods from its trading partners (Adeniran, 2021; Grimoux, 2018; Hung, 2008). This variable may account for shifts in employment within the industrial sector, in addition to the size of the industrial sector, if countries are becoming more reliant on primary sector material exports than manufacturing and industrial sector products. Primary goods can consist of materials such as gold, diamonds, and other raw natural resources. The data is taken from the UN COMTRADE dataset and logged to reduce skewness. Primary sector exports add to this study by accounting for increased trade in raw materials against the backdrop of industrial sector trade and Chinese investment.

The initial pull of China's trade statistics and global partners is used from the United Nations Commodity Trade Statistics Database to incorporate an overview of how the BRI affects participating and non-participating countries. This dataset is then merged with the World Bank's harmonized bilateral database. This database and indicators of Chinese investment are discussed in the following section.

3.5 Indicators of Chinese Investment

The Belt and Road Initiative (BRI) may amplify the investment between countries and China due to the nature of the cooperation agreements. China is known for significant overseas investments in the industrial sector, which include manufacturing, construction, and infrastructure (Zhu et al., 2023). Notably, scholarship finds how FDI can assist countries through information, demonstration, and competition spillover effects (Ombuki et al., 2023). This can increase employment and worker productivity and expedite the development of the industrial sector through these spillover effects (Orlic et al., 2018), apart from increasing economic growth (Borensztein et al., 1995; Doku et al., 2017; Zaman et al., 2021). However, inward and outward investment can also negatively affect less developed economies. Scholars find that inward FDI can also reduce employment and restrict economic growth in certain regions (Ben Mim et al., 2021) or have no significant influence on economic growth (Demir & Duan, 2017). The impact of FDI on economic growth is a topic of mixed opinions within the literature. It is crucial to carefully examine the influence of FDI on industrialization, particularly considering China's dual role as both a major source and a recipient of FDI.

A country's inward and outward foreign direct investment (FDI) stock with China indicates Chinese investment in the study. Data on FDI stock was drawn from the UN Harmonized Bilateral FDI Database, which provides data points on Chinese FDI stock from 2000 to 2023 (Steenbergen et al., 2022). The FDI stock values accumulated FDI totals from each year over time. FDI variables from this dataset included negative values for country years. To account for this, this analysis subtracts the minimum FDI value for all data points and then adds one. This negates any negative FDI values in the dataset. The variables are then logged to reduce skewness. Foreign direct investment is a way to account for multinational corporations' investments in a country.

3.6 Control Variables

This study provides significant data on how China's trade and investment affect countries' industrialization. This section provides the covariates used in this analysis. Accounting for the control variables supports that the results are non-spurious in nature. This study utilizes control variables to account for unobserved effects and spurious relationships. Specifically, I include the following control variables in the models: GDP per capita, Urban Growth Rate, Gross Capital Formation, total imports and primary sector imports, government consumption rate, Human Capital Index (HCI), and the labor rate.

GDP per capita is similar to industrial productivity, calculated by dividing the GDP by the total population, providing an average income per person, and is easily comparable across countries (World Bank, 2024). The urban growth rate and gross capital formation variables are also theorized to describe urbanization, indicating a country's industrialization. Gross capital formation includes fixed assets such as machinery and land improvements and the inventories firms have in stock (World Bank, 2024). Total imports and primary sector imports from China are theorized to control manufacturing imports and exports with China. The government consumption rate includes government expenses on goods and services, national defense, and security spending minus the military (World Bank, 2024), which controls for any spurious spending in this category that may lead to effects on industrialization indicators. The human capital index used in this study is from the Penn World Table v10 and is based on years of schooling and returns to education (Groningen Growth and Development Centre, 2023). Lastly, the labor rate controls industrial employment, consisting of individuals 15 and older who provide labor for goods and services (World Bank, 2024).

3.7 Descriptive Statistics

Table 2 provides summary statistics for all variables utilized in this study. The columns provide each variable's mean, standard deviation, minimum, and maximum levels. The independent variables are logged to reduce skewness.

Table 2: Summary Statistics

	Mean	SD	Min	Max
Size of Industrial Sector	26.904	9.450	6.255	73.673
Industrial Productivity	48518.009	52351.400	1539.794	300120.993
Size of Industrial Force	21.613	7.238	3.465	54.555
BRI	0.161	0.368	0.000	1.000
GDP per Capita	19989.489	21350.059	282.976	112417.878
Urban Growth	65.485	20.910	11.776	100.000
Government Consumption Rate	16.371	4.967	4.807	39.306
Labor Rate	69.080	9.171	38.058	89.205
Human Capital Index	2.803	0.638	1.162	4.352
Log Manufacturing Imports from China	-0.005	0.355	-1.232	1.473
Log Manufacturing Exports to China	-0.001	0.298	-0.203	1.750
Log Inward FDI Stock from China	-0.002	0.230	-0.633	1.917
Log Outward FDI Stock to China	0.001	0.350	-0.304	2.042
Log Primary Sector Imports from China	0.000	0.076	-0.034	0.512
Log Primary Sector Exports to China	0.000	0.231	-0.151	1.534
Total Imports	11.724	0.762	9.560	13.496

Note: All variables are N = 1355

Table 3 shows correlation statistics for all the variables used in this analysis. Some variables have notably high correlations. For example, industrial productivity and GDP per capita are highly correlated as they measure population productivity within a given country. The human capital index is also closely correlated to GDP per capita and industrial productivity, given that it is a population measurement. However, HCI measures years of schooling and returns to education, which can be closely related to the other population-focused variables. This study utilized variance inflation factor (VIF) models to assess the degree of correlation between variables. The VIF values conclude that there is no high collinearity between variables, with all VIF values under 5.

Table 3: Correlation Statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Size of Industrial Sector (1)	1															
Industrial Productivity (2)	0.167	1														
Size of Industrial Force (3)	0.313	0.050	1													
BRI (4)	0.056	-0.182	0.038	1												
GDP per Capita (5)	-0.099	0.883	0.148	-0.205	1											
Urban Growth (6)	0.069	0.550	0.329	-0.160	0.619	1										
Government Consumption Rate (7)	-0.080	0.357	0.26	-0.136	0.358	0.403	1									
Labor Rate (8)	-0.054	0.358	-0.044	-0.053	0.473	0.234	0.187	1								
Human Capital Index (9)	-0.048	0.517	0.435	-0.023	0.618	0.616	0.424	0.363	1							
Log Manufacturing Imports from China (10)	0.049	-0.284	-0.036	0.218	-0.267	-0.094	-0.343	-0.030	-0.067	1						
Log Manufacturing Exports to China (11)	0.054	0.111	0.051	0.011	0.194	0.268	-0.190	0.126	0.235	0.513	1					
Log Inward FDI Stock from China (12)	-0.120	-0.132	-0.29	0.119	-0.080	-0.116	-0.282	-0.017	-0.133	0.525	0.513	1				
Log Outward FDI Stock to China (13)	-0.128	0.205	-0.075	-0.088	0.236	0.212	-0.111	0.061	0.162	0.376	0.599	0.520	1			
Log Primary Sector Imports from China (14)	-0.015	-0.063	-0.088	0.078	0.006	0.069	-0.340	0.072	-0.018	0.550	0.682	0.573	0.531	1		
Log Primary Sector Exports to China (15)	0.332	-0.062	-0.125	0.150	-0.148	0.080	-0.231	0.023	-0.101	0.258	0.210	0.288	0.068	0.327	1	
Total Imports	0.031	0.431	0.418	-0.123	0.554	0.543	0.197	0.229	0.571	-0.07	0.381	-0.144	0.135	0.123	-0.066	1

Note: All variables are N = 1355

3.8 Regression Analysis

This study utilizes a two-way fixed effects panel regression model with robust clustered standard errors. Utilizing panel data allows researchers to gain insight into large amounts of time-series data to find causality within a given study. Panel data allows researchers to identify causal effects through quantitative analysis (Halaby, 2004). Wooldridge (2010) states, "A primary motivation for using panel data is to solve the omitted variables problem" (p. 247). These can be unidentified variables a researcher failed to recognize or attribute in the analysis which may biased the estimates of the regression model. In context of panel data, an unobserved effect is any unobserved time-constant variable (Wooldridge 2010). Panel regression is design to account for unobserved time-constant variables.

Ordinary Least Squares (OLS) regression is not an appropriate technique for this study because it assumes that random unobserved variables are uncorrelated through time. This is a large assumption as many unobserved effects could be correlated, especially when using the same country over multiple years, such as in this study. If these unobserved effects are correlated with the observable variables, then the pooled OLS method may contain biased results (Ibid). I test this Ordinary Least Squares (OLS) regression assumption with a Breusch-Pagan Lagrange Multiplier test for random effects. The Breusch-Pagan Lagrange Multiplier test determines whether the residuals are correlated within the dataset. Results for this analysis show the rejection of the null ($p<.05$) of no difference in the residuals between an OLS and panel model..

An essential consideration in panel data analysis is whether to apply a fixed- or a random-effects model to the data. A fixed-effects model discards between-unit variation, a significant advantage of panel data, which allows unobserved effects to be correlated with explanatory variables (Halaby, 2004). The fixed-effects model includes a set of fixed intercepts for each country, accounting for any unobserved effects that may be present in the dataset. This allows for a consistent estimate of partial effects even when correlated unobserved effects are on identified variables (Wooldridge, 2010). Additionally, a fixed-effects model can eliminate spurious unobserved effects on the results (Babones, 2009). This can provide significant utility when dealing with country-level data over time.

Another approach is to utilize a random intercept to account for unobserved heterogeneity. However, one issue with a random-effects approach is that if the unobserved effects are linked to the variables, it can lead to bias in the results and is more challenging to address than the fixed-effects model (Halaby, 2004). The random-effects modeling approach makes a strict exogeneity assumption that the unobserved effect is "…uncorrelated with the explanatory variables in all time periods" (Wooldridge, 2010, p. 65). The correlation of unobserved effects on the variables can bias both test results; however, there is much more flexibility with a fixed-effects model when dealing with heteroskedasticity and serial correlation (Halaby, 2004). Therefore, I utilized the Hausman Test to determine which model suits the panel data. This tests whether the unit effects and dependent variables are uncorrelated (Halaby, 2004). Of the 15 models ran, 13 rejected the null ($p<.05$) in favor of a fixed effects model. However, fixed effects are used for each model to maintain consistency and to compare finalized results.

I finalized the models using a Lagrange Multiplier test to determine whether this study should use a one-way or two-way fixed-effects modeling approach. This test determines if one-way or two-way effects should be used, with the null being a no-timed (one-way) fixed effects approach. The main difference between the two fixed-effects models is that the two-way model has an extra intercept for time within the panel data. The diagnostic results indicated that all models rejected the null ($p<.05$), favoring a two-way fixed effects model.

Accordingly, I test the main hypotheses of the study using the following regression model:

(1) $Y_{it} = \beta_0 + B_1X_{it} + B_2D_{it} + B_k\sum X_{kit} + \alpha_i + \tau_t + \varepsilon_{it}$

Equation 1 shows the two-way fixed-effects regression model. Y represents the indicators of industrialization of country i in year t. X represents the indicators of Chinese investment or trade of country i in year t. D represents a dummy variable for whether the country participates in a BRI agreement. X_k represents a vector of control variables. The terms α_i and τ_t are fixed intercepts for country and years. I test H_1 through H_6 by whether $B_1 > 0$. This indicates that Chinese trade and investment increases or decreases industrialization.

The hypothesis on the moderating role of BRI is tested using a modified version of Equation 1. Specifically, I test the hypotheses on the moderating effects of BRI with the following model:

(2) $Y_{it} = \beta_0 + B_1X_{it} + B_2D_{it} + B_3X_{it} * D_{it} + B_k\sum X_{kit} + \alpha_i + \tau_t + \varepsilon_{it}$

Equation 2 specifies the regression model with an interaction term between indicators of Chinese trade and investment (X) and an indicator of participation in a BRI agreement (D). This interaction effect measures the extent to which a BRI agreement moderates the Chinese trade and investment coefficient. I test H_7 by whether $B_3 \neq 0$. This tests if significant differences exist in how Chinese trade and investment affect industrialization in BRI and non-BRI countries.

Notably, a fixed-effects model is highly likely to have heteroskedasticity in the residuals (Halaby, 2004). Heteroskedasticity is present when the "…residuals at each level of the predictor variable(s) have unequal variances…[whereas] each point along any predictor variable, the spread of residuals is different." (Field, 2018, p. 742, brackets added). Breusch-Pagan heteroskedasticity tests showed unequal variances in 11 of the 15 full models. Further diagnostic tests to address heteroskedasticity in the residuals are detailed in the following sections.

This study furthers diagnostic tests on fixed-effects model results. Fixed-effects models relax the assumption that there is a correlation between intercepts within the model. Therefore, due to this inefficiency, there may be a high degree of serial correlation. Wooldridge (2010) interprets serial correlation as "The error in each time period [that] contains a time-constant omitted factor" (p. 176, brackets added). Millo (2017) cautions that fixed effect modeling promotes serial correlation within residuals (p. 13). This study uses the Breusch-Godfrey and Wooldridge test for serial correlation; the null is that there is no serial correlation. The results show that 13 models reject the null ($p<.05$) and test positive for serial correlation. This study also tests unit roots and cross-sectional dependence. No unit root is present in the models, and tests show instances of cross-sectional dependency. The tests confirm that the results are biased and that the standard errors in the analysis need to be addressed.

The results show heteroskedasticity and serial correlation, which can be addressed using robust covariance estimators to account for these disturbances (Halaby, 2004). This analysis uses robust clustered standard errors to account for heteroskedasticity and serial correlation utilizing the "sandwich" package in R-studio. The Arellano method is used as a covariance estimator, providing robust standard errors while accounting for heteroskedasticity and serial correlation across time series (Millo, 2017). The following section will outline the results of this study's analysis using the methods described in Chapter 3.

Chapter 4 - Results

This study postulates that increased manufacturing trade from China, outward FDI stock to China, and primary sector exports to China decrease industrialization. This may be due to increased exposure to cheaper manufacturing imports from China and the adverse effects of the China Shock syndrome. Domestic firms may be unable to compete with other countries due to the rapid introduction of global competition and those domestic firms may be replaced by foreign competition. Additionally, concentration in the primary sector will detract from domestic investment and overall growth within the industrial sector.

On the other hand, exports to China and inward FDI from China possibly increase industrial employment, the size of the industrial sector, and industrial worker productivity. These factors can strengthen a country's industrial sector and support economic growth. Growth in these areas of economic activity can indicate robust economies and industrial sector expansion. The sector also benefits from trade and investment spillover effects from a developed trading partner such as China.

Based on these arguments, I estimated a series of two-way fixed-effects models to determine the effects of Chinese trade and investment on each indicator of industrialization.

4.1 Size of the Industrial Labor Force

This section shows models of the size of the industrial labor. This indicates industrialization because it represents employment in the industrial sector as a percentage of total employment. Any fluctuations of this variable can substantially impact a country's economy.

Table 4 shows estimates of two-way fixed-effects panel models of the size of the industrial labor force. The first model estimates the effects of manufacturing imports from China and whether a country is actively participating in a Belt Road Initiative (BRI) agreement.

According to Model 1, an increase of 1 percent in the manufacturing imports from China is associated with the industrial labor force increasing by 3.8 percent of the total labor force when controlling for participation in BRI (p<.01). Additionally, the size of the industrial labor force in countries participating in a BRI agreement is larger compared to countries not participating in a BRI agreement when controlling for manufacturing imports from China (p<.01).

Table 4: Two-Way Fixed Effects Model on Size of the Industrial Labor Force

	(1)	**(2)**	**(3)**	**(4)**
Manufacturing Imports from China	3.778***	1.473**	3.547***	1.340**
	(0.948)	(0.646)	(0.957)	(0.651)
BRI	1.236***	0.996***	0.864***	0.737***
	(0.335)	(0.253)	(0.305)	(0.244)
Manufacturing Imports from China x BRI			2.397*	1.660*
			(1.327)	(0.869)
Human Capital		-3.506***		-3.654***
		(1.017)		(1.059)
Urban Growth Rate		0.131		0.128
		(0.081)		(0.080)
Government Consumption Rate		-0.001		-0.012
		(0.058)		(0.059)
Gross Capital Formation		0.024		0.024
		(0.027)		(0.027)
Total Imports		12.187***		11.907***
		(2.042)		(1.995)
GDP per Capita		-0.000*		-0.000**
		(0.000)		(0.000)
Labor Rate		-0.068		-0.062
		(0.064)		(0.064)
Primary Sector Imports from China		-0.275		-0.687
		(2.475)		(2.433)
R^2	0.120	0.389	0.139	0.398

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

Model 2 re-estimates these effects when controlling for a large set of covariates. According to Model 2, a 1 percent increase in Chinese manufacturing imports is associated with a 1.5 percentage point increase in industrial employment, all else constant ($p<.05$).

Model 3 estimates the interaction between Chinese manufacturing imports and BRI participation in a simple model. According to Model 3, involvement in a BRI agreement amplifies the positive effect of Chinese manufacturing imports on industrial employment ($p<.1$). Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, participation in a BRI agreement still amplifies the positive effect of Chinese manufacturing imports on industrial employment, all else constant ($p<.1$).

The findings from Table 4 fail to support H_1. Imports from China positively correlate with increases in industrial employment. However, the findings from this study support existing literature that imports from China can positively impact industrialization in foreign economies (Medina, 2024) and negate China Shock claims. Moreover, the results confirm H_7 that the BRI amplifies the positive effect of manufacturing imports from China on industrialization, showing a significant increase in industrial employment in BRI participating countries.

Table 5 shows estimates from two-way fixed effects panel models of the size of the industrial labor force. The first model estimates the effects of manufacturing exports to China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of manufacturing exports to China on industrial employment. However, the size of the industrial labor force in countries participating in a BRI agreement is 1.3 percent larger when controlling for manufacturing exports to China ($p<.01$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of manufacturing exports to China on industrial employment, all else constant.

Table 5: Two-Way Fixed Effects Model on Size of the Industrial Labor Force

	(1)	(2)	(3)	(4)
Manufacturing Exports to China	1.020	1.135	0.376	0.388
	(2.316)	(1.119)	(2.126)	(1.083)
BRI	1.333***	0.985***	1.319***	0.966***
	(0.332)	(0.253)	(0.318)	(0.239)
Manufacturing Exports to China x BRI			1.502	1.882**
			(1.433)	(0.749)
Human Capital		-3.505***		-3.818***
		(1.033)		(1.066)
Urban Growth		0.117		0.106
		(0.081)		(0.078)
Government Consumption		-0.005		-0.023
		(0.058)		(0.059)
Gross Capital Formation		0.038		0.040
		(0.027)		(0.026)
Total Imports		12.674***		12.592***
		(2.046)		(2.016)
GDP per Capita		-0.000**		-0.000**
		(0.000)		(0.000)
Labor Rate		-0.070		-0.068
		(0.065)		(0.064)
Primary Sector Imports from China		-0.035		-0.581
		(2.509)		(2.515)
R^2	0.049	0.382	0.056	0.392

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

Model 3 estimates the interaction between Chinese manufacturing exports and BRI participation in a simple model. According to Model 3, participation in the BRI does not moderate the effect of manufacturing exports to China on employment in the industrial sector.

Model 4 re-estimates the interaction when controlling for a large set of covariates. Results show there is no effect of manufacturing exports on industrial employment in non-BRI participating countries. Model 4 results show that for every 1 percent increase in manufacturing exports to China, there is a 2.27 percent increase in industrial employment, all else constant ($p<.05$). Surprisingly, in Model 4, participation in a BRI agreement amplifies the positive effect of manufacturing exports to China on industrial employment, holding all else constant.

The findings from Table 5 finds partial support for H_2. Manufacturing exports to China have no effect on industrial employment in non-BRI countries, whereas manufacturing exports to China positively correlate with increases in industrial employment in BRI participating countries. The results include developed and less developed countries.

This study analyzes the effect of manufacturing exports to China on foreign economies' industrialization, comparing BRI-participating countries to those without formal BRI agreements. Table 5 concludes that manufacturing exports to China positively influence the industrial employment of BRI participating countries. Additionally, the results partially confirm H_7 that the BRI amplifies the positive effect of manufacturing exports to China on industrialization, showing a significant increase in industrial employment in BRI participating countries.

Table 6 shows the estimates from two-way fixed effects panel models of the size of the industrial labor force. The first model estimates the effects of inward foreign direct investment (FDI) stock from China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of inward FDI stock from China on industrial employment. Additionally, the size of the industrial labor force in countries participating in a BRI agreement is 1.4 percent larger when controlling for inward FDI stock from China ($p<.01$).

Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of inward FDI from China on industrial employment, all else constant. Model 3 estimates the interaction between FDI from China and BRI participation in a simple model. According to Model 3, there is no effect of inward FDI on industrial employment. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is no effect of inward FDI stock from China on industrial employment in non-BRI participating countries. However, Model 4 shows that in BRI countries, for every 1 percent increase in inward FDI stock from China, there is a 2.50 percent increase in industrial employment, all else constant ($p<.1$). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries. These values are depicted in Table 19.

Table 6: Two-Way Fixed Effects Model on Size of the Industrial Labor Force

	(1)	**(2)**	**(3)**	**(4)**
Inward FDI Stock from China	0.021	0.385	-0.620	-0.230
	(1.291)	(0.812)	(1.078)	(0.733)
BRI	1.354***	1.000***	1.263***	0.913***
	(0.341)	(0.250)	(0.313)	(0.248)
Inward FDI Stock from China x BRI			2.710	2.726*
			(2.339)	(1.412)
Human Capital		-3.514***		-3.821***
		(1.038)		(1.095)
Urban Growth		0.124		0.117
		(0.081)		(0.083)
Government Consumption		-0.007		0.006
		(0.058)		(0.057)
Gross Capital Formation		0.035		0.033
		(0.027)		(0.027)
Total Imports		12.744***		12.822***
		(2.072)		(2.045)
GDP per Capita		-0.000**		-0.000**
		(0.000)		(0.000)
Labor Rate		-0.062		-0.044
		(0.065)		(0.068)
Primary Sector Imports from China		-0.343		-0.497
		(2.596)		(2.526)
R^2	0.047	0.381	0.058	0.391

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

The findings from Table 6 partially support H_4. Inward FDI from China has no effect on industrial employment in non-BRI participating countries. However, Inward FDI from China positively correlates with increases in the size of the industrial labor force in BRI participating countries. The results include developed and less developed countries. This supports the existing literature that shows FDI inflows positively influence industrialization (Doku et al., 2017; Ombuki et al., 2023), although specifically in nations with formal BRI agreements with China.

This study examines the impact of Chinese inward FDI on the industrialization of foreign economies, comparing BRI-participating countries with those without formal BRI agreements. Table 6 concludes that inward FDI stock from China has no effect on non-BRI participating countries. However, the results partially support H_7. The BRI amplifies the effects of inward FDI from China on industrialization, showing a significant increase in industrial employment in BRI-participating countries.

Table 7 shows the estimates from two-way fixed effects panel models of the size of the industrial labor force. The first model estimates the effects of outward FDI stock to China on whether a country actively participates in a BRI agreement. According to Model 1, an increase of one percent in FDI to China is associated with the industrial labor force decreasing by 4.1 percent of the total labor force when controlling for participation in the BRI ($p<.01$). Additionally, the size of the industrial labor force in countries participating in a BRI agreement is 1.3 percent larger when controlling for outward FDI stock to China ($p<.01$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, a one percent increase in FDI to China is associated with a 2.4 percentage point decrease in industrial employment, all else constant ($p<.01$). Model 3 estimates the interaction between FDI to China and BRI participation in a simple model. According to Model 3, there is a negative correlation between outward FDI stock to China and industrial employment ($p<.01$). Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is a negative correlation between outward FDI stock to China and the size of the industrial labor force, all else constant ($p<.01$). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries. According to Table 7, there is a negative correlation of outward FDI stock to China on industrial employment in countries outside the BRI umbrella and those with formal BRI agreements, all else constant ($p<.01$). These values are also depicted in Table 19.

Table 7: Two-Way Fixed Effects Model on Size of the Industrial Labor Force

	(1)	**(2)**	**(3)**	**(4)**
Outward FDI Stock to China	-4.139***	-2.446***	-4.146***	-2.676***
	(1.135)	(0.656)	(1.263)	(0.845)
BRI	1.248***	0.990***	1.249***	1.021***
	(0.320)	(0.241)	(0.331)	(0.238)
Outward FDI Stock to China x BRI			0.017	0.610
			(1.301)	(0.578)
Human Capital		-3.178***		-3.363***
		(0.959)		(1.030)
Urban Growth		0.125		0.124
		(0.081)		(0.082)
Government Consumption		0.007		0.004
		(0.056)		(0.057)
Gross Capital Formation		0.035		0.033
		(0.026)		(0.027)
Total Imports		12.135***		12.177***
		(2.072)		(2.076)
GDP per Capita		-0.000		-0.000
		(0.000)		(0.000)
Labor Rate		-0.076		-0.076
		(0.060)		(0.060)
Primary Sector Imports from China		-0.941		-1.149
		(2.519)		(2.533)
R^2	0.102	0.397	0.102	0.398

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

The findings from Table 7 support H_6. Outward FDI to China negatively affects the size of the industrial labor force. The results include developed and less developed countries. There is a negative correlation between industrial employment and when foreign economies increase outward FDI to China. This bilateral relationship favors BRI countries with formal agreements, where the negative impact of increased outward FDI to China is smaller than in non-BRI participating countries. However, the results fail to support H_7. Table 7 shows no difference between non-BRI participating countries and those with formal BRI agreements.

Table 8 shows the estimates from two-way fixed effects panel models of the size of the industrial labor force. The first model estimates the effects of primary sector exports to China on whether a country actively participates in a BRI agreement. According to Model 1, primary sector imports from China have no effect on industrial employment. Additionally, the size of the industrial labor force in countries participating in a BRI agreement is 1.4 percent larger when controlling for primary sector exports to China ($p<.01$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, primary sector exports have no effect on industrial employment, all else constant. Model 3 estimates the interaction between primary sector exports to China and BRI participation in a simple model. According to Model 3, primary sector imports have no effect on industrial employment. Model 4 re-estimates the interaction when controlling for a large set of covariates. According to Model 4, primary sector imports have no effect on the size of the industrial labor force in non-BRI and BRI participating countries.

Table 8: Two-Way Fixed Effects Model on Size of the Industrial Labor Force

	(1)	(2)	(3)	(4)
Primary Sector Exports to China	-0.964	-0.281	-0.889	-0.415
	(1.347)	(1.208)	(1.397)	(1.144)
BRI	1.357***	1.005***	1.365***	0.987***
	(0.338)	(0.251)	(0.333)	(0.248)
Primary Sector Exports to China x BRI			-0.232	0.448
			(0.935)	(0.902)
Human Capital		-3.468***		-3.484***
		(1.006)		(1.006)
Urban Growth		0.124		0.119
		(0.081)		(0.081)
Government Consumption		-0.005		-0.005
		(0.058)		(0.058)
Gross Capital Formation		0.035		0.036
		(0.027)		(0.027)
Total Imports		12.749***		12.810***
		(2.031)		(2.023)
GDP Per Capita		-0.000**		-0.000**
		(0.000)		(0.000)
Labor Rate		-0.064		-0.061
		(0.064)		(0.064)
Primary Sector Imports from China		-0.091		-0.063
		(2.561)		(2.552)
R^2	0.049	0.380	0.049	0.381

*Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1*

The findings from Table 8 find no support for H_3. This study finds no effects of primary sector imports on industrial employment. The results include developed and less developed countries. This study examines the impact of primary sector exports to China on the industrialization of foreign economies, comparing BRI-participating countries with those without formal BRI agreements. Table 8 concludes that primary sector exports to China have no effect on the size of the industrial sector in non-BRI participating countries and those with formal agreements. Therefore, the results show no support for H_7.

Figure 7 shows predicted values of the size of the industrial labor force across levels of manufacturing imports, exports, inward FDI, outward FDI, and primary exports. Manufacturing imports from China increase the size of the industrial labor force, while BRI amplifies this effect. Notably, this difference begins at the onset of trade with China.

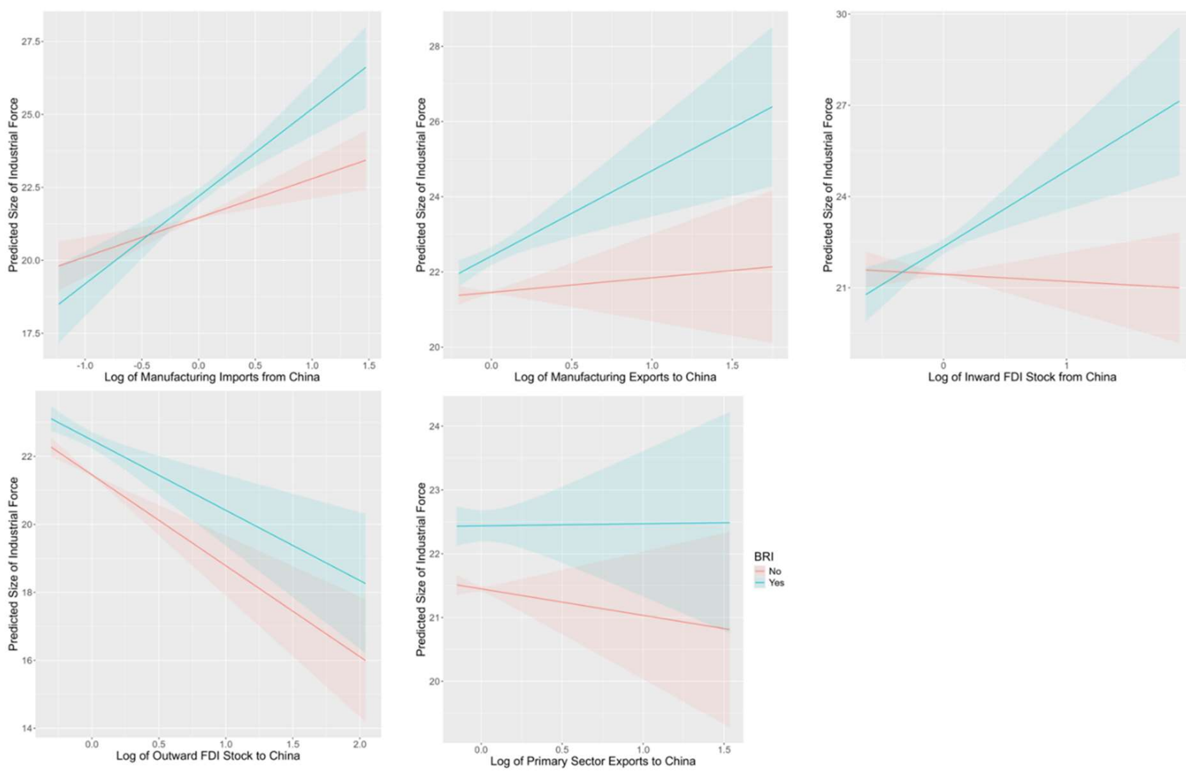

Figure 7: Plot Prediction on Size of the Industrial Labor Force

The second panel shows manufacturing exports to China, which increase the size of the industrial force in both BRI and non-BRI countries. Like panel one, the BRI amplifies this effect at the early stages of trade with China, increasing the size of the industrial labor force at a higher rate than non-BRI countries. Panel 3 details inward FDI stock from China on the size of the industrial force. The BRI significantly increases the size of the industrial force at the beginning of inward investment from China compared to non-BRI countries that see a gradual decrease in the size of the industrial labor force as inward FDI stock increases. The fourth panel shows outward FDI stock on the size of the industrial labor force, highlighting that both BRI and non-BRI countries' outward FDI stock to China decreases the size of the industrial workforce. Compared to non-BRI countries, outward FDI stock to China decreases industrial employment in BRI-participating countries, although at the same rate and to a lesser extent. The last panel depicts the effects of primary exports to China on the size of the industrial labor force. The BRI marginally increases the size of the industrial force when primary sector exports to China increase. In contrast, non-BRI countries see a decline in the size of the industrial workforce as primary sector imports increase.

4.2 Size of the Industrial Sector

This section provides findings on how Chinese trade and investment affect the size of the industrial sector as a percentage of gross domestic product (GDP). The dependent variable used in Tables 8 through 12 is the size of the industrial sector as a percentage of total GDP. This indicates industrialization because it represents several leading sectors, such as manufacturing and construction value-added, significantly contributing to overall gross domestic product (GDP). Any effects from Chinese trade and investment that impact a country's industrial sector can significantly affect a country's economy.

Table 9 **s**hows the estimates from two-way fixed effects panel models of the size of the industrial sector as a percentage of GDP. The first model estimates the effects of manufacturing imports from China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect in manufacturing imports from China on industry value added when controlling for participation in the BRI. Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of manufacturing imports from China on the size of the industrial sector, all else constant. Model 3 estimates the interaction between manufacturing imports from China and BRI participation in a simple model. According to Model 3, manufacturing imports have no effect on the size of the industrial sector. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, manufacturing imports have no effect on industry value added in non-BRI participating countries. This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries (see Table 19). According to model 4, for every one percent increase in manufacturing imports from China, there is a 2.05 percent increase in the size of the industrial sector, all else constant ($p<.05$).

The findings from Table 9 conclude partial support for H_1. Imports from China have no effect on non-BRI participating countries. However, regarding BRI participating countries, imports from China increase the size of the industrial sector. The findings include both developed and less developed countries.

Table 9: Two-Way Fixed Effects Model on the Size of the Industrial Sector

	(1)	(2)	(3)	(4)
Manufacturing Imports from China	0.065	-0.060	-0.117	-0.243
	(1.314)	(0.740)	(1.350)	(0.753)
BRI	0.540	0.318	0.247	-0.039
	(0.396)	(0.326)	(0.470)	(0.410)
Manufacturing Imports from China x BRI			1.886	2.289*
			(1.608)	(1.298)
Human Capital		-2.376		-2.581
		(1.775)		(1.833)
Urban Growth Rate		0.092		0.088
		(0.109)		(0.111)
Government Consumption Rate		-0.721***		-0.736***
		(0.108)		(0.109)
Gross Capital Formation		-0.011		-0.011
		(0.048)		(0.047)
Total Imports		7.911***		7.525***
		(2.191)		(2.093)
GDP per Capita		0.000*		0.000*
		(0.000)		(0.000)
Labor Rate		0.008		0.016
		(0.071)		(0.071)
Primary Sector Imports from China		-4.616		-5.185
		(4.703)		(4.842)
R^2	0.004	0.268	0.009	0.276

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

This study analyzes the impacts of imports from China on foreign economies' industrialization, comparing BRI-participating countries to those without formal BRI agreements. The results from Table 9 partially support H_7. The BRI amplifies the effects of manufacturing imports from China on industrialization, showing a significant increase in the size of the industrial sector in BRI-participating countries compared to those not participating in formal BRI agreements.

Table 10 shows the estimates from two-way fixed effects panel models on the size of the industrial sector as a percentage of GDP. The first model estimates the effects of manufacturing exports to China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of manufacturing exports to China on the industrial sector. Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of manufacturing exports to China on the size of the industrial sector, all else constant. Model 3 estimates the interaction between exports to China and BRI participation in a simple model. According to Model 3, there is no effect of manufacturing exports ot China on the size of the industrial sector. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is no effect of manufacturing exports to China on the size of industry in non-BRI and BRI participating nations.

The findings from Table 10 fail to support H_2. Manufacturing exports to China have no effect on the size of the industrial sector. The results include developed and less developed countries.

Table 10: Two-Way Fixed Effects Model on the Size of the Industrial Sector

	(1)	(2)	(3)	(4)
Manufacturing Exports to China	1.409	0.207	2.060	0.304
	(2.015)	(1.770)	(1.931)	(1.811)
BRI	0.514	0.314	0.528	0.316
	(0.395)	(0.332)	(0.389)	(0.332)
Manufacturing Exports to China x BRI			-1.516	-0.245
			(0.974)	(1.160)
Human Capital		-2.381		-2.340
		(1.762)		(1.821)
Urban Growth		0.091		0.092
		(0.112)		(0.111)
Government Consumption		-0.721***		-0.719***
		(0.108)		(0.109)
Gross Capital Formation		-0.011		-0.011
		(0.047)		(0.047)
Total Imports from China		7.871***		7.881***
		(2.067)		(2.070)
GDP per Capita		0.0002*		0.0002*
		(0.0001)		(0.0001)
Labor Rate		0.007		0.006
		(0.069)		(0.069)
Primary Sector Imports from China		-4.604		-4.533
		(4.733)		(4.778)
R^2	0.005	0.268	0.009	0.268

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

This study analyzes the effect of manufacturing exports to China on foreign economies' industrialization, comparing BRI participating countries to those without formal BRI agreements. Table 10 concludes that manufacturing exports to China have no effect on the size of the industrial sector of non-BRI participating countries and those with formal BRI agreements.

Additionally, the results fail to support H_7.

Table 11 shows the estimates from two-way fixed effects panel models on the size of the industrial sector as a percentage of GDP. The first model estimates the effects of inward FDI stock from China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of inward FDI stock from China on the size of industry. Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, inward FDI stock from China has no effect on the size of industry, all else constant. Model 3 estimates the interaction between inward FDI stock from China and BRI participation in a simple model. According to Model 3, there is no effect of inward FDI from China on the size of the industrial sector in non-BRI participating countries. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is no effect of inward FDI stock from China on the size of industry. However, for BRI participating countries, for every one percent increase in inward FDI stock from China, there is a 3.65 percent increase in the size of the industrial sector, all else constant ($p<.01$).

The findings from Table 11 show mixed results when considering inward FDI stock from China. Inward FDI from China positively correlates with increases in the size of the industrial sector in BRI participating countries, finding partial support for H_4. The results include developed and less developed countries.

Table 11: Two-Way Fixed Effects Model on the Size of the Industrial Sector

	(1)	**(2)**	**(3)**	**(4)**
Inward FDI Stock from China	0.274	-0.306	-0.986	-1.458
	(1.325)	(1.355)	(1.381)	(1.283)
BRI	0.542	0.321	0.363	0.158
	(0.401)	(0.324)	(0.394)	(0.336)
Inward FDI Stock from China x BRI			5.330**	5.106***
			(2.193)	(1.574)
Human Capital		-2.355		-2.930
		(1.748)		(1.962)
Urban Growth Rate		0.092		0.079
		(0.109)		(0.110)
Government Consumption Rate		-0.719***		-0.695***
		(0.108)		(0.109)
Gross Capital Formation		-0.011		-0.016
		(0.047)		(0.046)
Total Imports		7.905***		8.052***
		(2.092)		(1.916)
GDP per Capita		0.0002**		0.0002**
		(0.0001)		(0.0001)
Labor Rate		0.006		0.040
		(0.070)		(0.067)
Primary Sector Imports from China		-4.456		-4.745
		(4.830)		(4.749)
R^2	0.004	0.268	0.024	0.286

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

This study examines the impact of Chinese inward FDI on the size of the industrial sector of foreign economies, comparing BRI participating countries to those without formal BRI agreements. Table 11 concludes that inward FDI stock from China positively correlates with the size of the industrial sector in BRI-participating nations. These results partially support H_7. The BRI amplifies the effect of inward FDI from China on industrialization in BRI participating countries, showing a significant increase in industrial value added in BRI participating countries.

Table 12 shows the estimates from two-way fixed effects panel models on the size of the industrial sector as a percentage of GDP. The first model estimates the effects of outward FDI stock to China on whether a country actively participates in a BRI agreement. According to Model 1, outward FDI stock to China has no effect on the industrial sector. Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, outward FDI stock to China has no effect on the size of the industrial sector, all else constant. Model 3 estimates the interaction between outward FDI stock to China and BRI participation in a simple model. According to Model 3, there is no effect of outward FDI stock to China on the size of the industry. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is no effect of outward FDI stock to China on the size of the industrial sector in non-BRI participating countries. In BRI participating countries, for every one percent increase in outward FDI stock to China, there is a 1.80 percent increase in the size of the industrial sector, all else constant ($p<.05$). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries (see Table 19).

Table 12: Two-Way Fixed Effects Model on the Size of the Industrial Sector

	(1)	(2)	(3)	(4)
Outward FDI Stock to China	1.061	1.238	1.415	0.895
	(1.928)	(1.347)	(2.303)	(1.562)
BRI	0.569	0.324	0.529	0.370
	(0.382)	(0.319)	(0.391)	(0.325)
Outward FDI Stock to China x BRI			-0.872	0.908
			(1.114)	(1.053)
Human Capital		-2.533		-2.810
		(1.710)		(1.951)
Urban Growth		0.091		0.089
		(0.108)		(0.108)
Government Consumption		-0.727***		-0.732***
		(0.108)		(0.110)
Gross Capital Formation		-0.011		-0.013
		(0.047)		(0.047)
Total Imports		8.207***		8.269***
		(2.104)		(2.117)
GDP per Capita		0.0002*		0.0002*
		(0.0001)		(0.0001)
Labor Rate		0.014		0.015
		(0.069)		(0.070)
Primary Sector Imports from China		-4.214		-4.524
		(4.621)		(4.729)
R^2	0.005	0.270	0.006	0.271

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

The findings from Table 12 fail to support H_6. Outward FDI to China positively affects the size of the industrial sector in BRI participating countries. The results include developed and less developed countries. There is a positive correlation between the size of the industrial sector and when foreign economies increase outward FDI to China in countries with formal BRI agreements. This bilateral relationship regarding outward FDI stock to China favors BRI countries with formal agreements.

This study examines the impact of outward FDI stock on China's industrialization of foreign economies, comparing BRI participating countries to those without formal BRI agreements. Table 12 concludes that outward FDI stock to China positively affects the size of the industrial sector in BRI participating countries. Table 12 shows partial support for H_7. The BRI amplifies the positive effect of outward FDI stock to China on industrialization, showing substantial increases in the size of the industrial sector in countries that have formal BRI agreements.

Table 13 shows the estimates from two-way fixed effects panel models on the size of the industrial sector as a percentage of GDP. The first model estimates the effects of primary sector exports to China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of primary sector exports to China on the size of the industrial sector. Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of primary sector exports to China negatively on the size of industry, all else is constant. Model 3 estimates the interaction between primary sector exports to China and BRI participation in a simple model. According to Model 3, there is no effect of primary sector exports to China on the size of the industrial sector. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is no effect of primary sector imports on the size of industry in non-BRI participating countries, all else constant. In countries with formal BRI agreements, for every one percent increase in primary sector exports to China, there is a -1.57 percent decrease in the size of the industrial sector, all else constant (p<.1). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries (see Table 19).

Table 13: Two-Way Fixed Effects Model on the Size of the Industrial Sector

	(1)	**(2)**	**(3)**	**(4)**
Primary Sector Exports to China	-1.334	-0.462	-0.691	0.010
	(2.396)	(2.084)	(2.308)	(1.993)
BRI	0.547	0.318	0.616	0.380
	(0.402)	(0.328)	(0.402)	(0.325)
Primary Sector Exports to China x BRI			-1.996	-1.583
			(1.682)	(1.245)
Human Capital		-2.347		-2.289
		(1.744)		(1.681)
Urban Growth		0.093		0.109
		(0.109)		(0.107)
Government Consumption		-0.721***		-0.722***
		(0.108)		(0.108)
Gross Capital Formation		-0.012		-0.014
		(0.047)		(0.047)
Total Imports		7.858***		7.642***
		(2.046)		(1.989)
GDP Per Capita		0.0002**		0.0002**
		(0.0001)		(0.0001)
Labor Rate		0.007		-0.006
		(0.071)		(0.069)
Primary Sector Imports from China		-4.551		-4.649
		(4.702)		(4.550)
R^2	0.005	0.268	0.011	0.272

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

The findings from Table 13 partially support H_3. Primary sector exports to China negatively affect the size of the industrial sector in BRI-participating countries. The results include developed and less developed countries. The findings depict that BRI agreements are detrimental to countries that orient economies to the primary sector.

This study examines the impact of primary sector exports to China on the industrialization of foreign economies, comparing BRI participating countries with those without formal BRI agreements. Table 13 concludes that primary sector exports to China negatively affect the size of industry in countries with formal BRI agreements. The results from Table 13 show partial support for H_7. The BRI amplifies the negative effect of primary sector imports on industrialization in those countries with BRI agreements.

Figure 8 shows predicted values for each central coefficient on the size of the industrial sector. Panel one shows the effects of manufacturing imports from China on the size of the industrial sector, where the BRI has a positive impact compared to non-BRI countries. The BRI increases the size of the industrial sector at the commencement of manufacturing imports from China compared to a decrease in non-BRI countries. The second panel depicts how manufacturing exports to China affect the industry's size. The two have nearly the same effect for BRI and non-BRI countries, with non-BRI countries increasing their industry size as manufacturing exports increase while BRI countries remain constant. However, at significantly high increases in manufacturing exports to China, there may be a larger positive effect on the size of the industrial sector in non-BRI countries. Panel 3 shows predictions of inward FDI stock from China on the size of the industrial sector. At very low levels of inward FDI stock from China, there is a significantly large increase in the size of the industrial sector for BRI participating countries. Non-BRI countries, on the other hand, show a negative correlation between increased inward FDI stock from China and the size of the industry at the onset of bilateral investment. The fourth panel shows outward FDI stock's effects on the size of the industrial sector. Notably, the BRI amplifies the positive effect, increasing the size of the industrial sector at early levels of outward FDI stock at a higher rate compared to non-BRI participating countries. The last panel shows the effects of primary sector exports on the size of the industrial sector. BRI participating countries are experiencing a decrease in the size of the industrial sector when primary sector exports to China increase, whereas, in non-BRI countries, there is a minimal effect. This negative relationship on the industry's size becomes more pronounced following a 0.25 percent increase in primary sector exports to China in BRI participating countries.

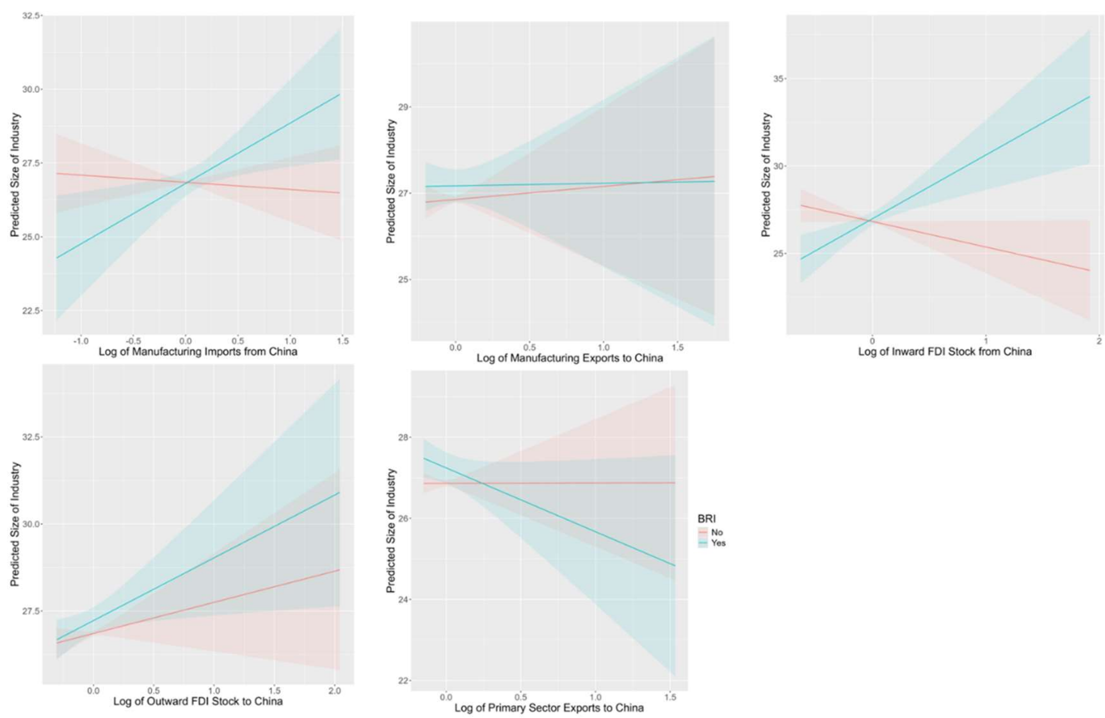

Figure 8: Plot Prediction on Size of the Industrial Sector

4.3 Industrial Worker Productivity

This section provides findings on how Chinese trade and investment affect industrial worker productivity as an individual's value added in the industrial sector. The dependent variable used in Tables 14 through 18 is industrial worker productivity. This represents industrialization as it signifies increased net productivity from workers in the industrial sector. Effects from Chinese trade and investment that impact a country's worker productivity can impact worker efficiency and employment levels in a critical sector of the economy.

Table 14 **s**hows the estimates from two-way fixed effects panel models of industrial worker productivity. The first model estimates the effects of manufacturing imports from China on whether a country actively participates in a BRI agreement. According to Model 1, an increase of one percent in manufacturing imports from China is associated with industrial worker productivity decreasing by $19,542 when controlling for participation in the BRI ($p<.1$). Additionally, industrial worker productivity in countries participating in a BRI agreement is $4,369 smaller when controlling for manufacturing imports from China ($p<.05$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of manufacturing imports from China on industrial worker productivity, all else constant. Model 3 estimates the interaction between manufacturing imports from China and BRI participation in a simple model. According to Model 3, there is a negative correlation between manufacturing imports from China and industrial worker productivity ($p<.1$). Model 4 re-estimates the interaction when controlling for a large set of covariates. Inconsistent with Model 3, there is no effect of manufacturing imports from China on industrial worker productivity in non-BRI participatin countries. However, for BRI-participating countries, for every one percent increase in manufacturing imports from China, there is a -$7,899.00 decrease in industrial worker productivity, all else constant (p<.01). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries (see Table 19).

Table 14: Two-Way Fixed Effects Model on Industrial Worker Productivity (cUSD 2015)

	(1)	**(2)**	**(3)**	**(4)**
Manufacturing Imports from China	-19,542.410*	-6,840.628	-19,912.920*	-6,748.929
	(11,766.990)	(5,738.149)	(12,035.020)	(5,720.737)
BRI	-4,369.301**	-1,863.125**	-4,968.615**	-1,683.846**
	(2,042.112)	(768.254)	(2,213.335)	(741.658)
Manufacturing Imports from China x BRI			3,853.745	-1,150.303
			(5,238.910)	(3,584.896)
Human Capital		8,060.677		8,163.541
		(6,001.485)		(6,128.634)
Urban Growth Rate		529.451		531.422
		(341.166)		(338.719)
Government Consumption Rate		-732.020**		-724.286**
		(356.926)		(354.268)
Gross Capital Formation		-70.802		-70.632
		(119.386)		(119.061)
Total Imports from China		-674.366		-480.435
		(6,722.023)		(6,779.292)
GDP per Capita		3.598***		3.602***
		(0.761)		(0.760)
Labor Rate		-803.251		-807.161
		(522.324)		(521.427)
Primary Sector Imports from China		-31,274.460		-30,988.860
		(23,272.880)		(23,266.500)
R^2	0.066	0.505	0.067	0.505

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

The findings from Table 14 partially support H_1. Manufacturing imports from China negatively correlate with industrial worker productivity in countries with formal BRI agreements The findings include both developed and less developed countries. The results contradict several findings that Chinese competition increases industrial worker productivity (Mion & Zhu, 2013; Moreira et al., 2023).

This study analyzes the impacts of imports from China on foreign economies' industrialization, comparing BRI-participating countries to those without formal BRI agreements. Table 14 concludes that manufacturing imports from China negatively affect industrial worker productivity in BRI-participating countries. The results partially support H_7. The BRI amplifies the negative effect of manufacturing imports from China on industrialization.

Table 15 shows the estimates from two-way fixed effects panel models on industrial worker productivity. The first model estimates the effects of manufacturing exports to China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of exports to China on industrial worker productivity when controlling for participation in the BRI. Additionally, industrial worker productivity in countries participating in a BRI agreement is $4,369 smaller when controlling for manufacturing exports to China ($p<.05$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, a one percent increase in manufacturing exports to China is associated with a $8,946 decrease in industrial worker productivity, all else constant ($p<.05$). Model 3 estimates the interaction between manufacturing exports to China and BRI participation in a simple model. According to Model 3, there is no effect of manufacturing exports to China on industrial worker productivity. Model 4 re-estimates the interaction when controlling for a large set of covariates. Contrary to Model 3, manufacturing exports to China decrease worker productivity in countries without formal BRI agreements ($p<.1$), all else constant. Similarly, for every one percent increase in manufacturing exports to China, there is a decrease of $9,297.00 in worker productivity, all else constant ($p<.01$). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries (see Table 19).

The findings from Table 15 fail to support H_2. Manufacturing exports to China negatively correlate to industrial worker productivity. The results include developed and less developed countries, and BRI and non-BRI participating counties.

Table 15: Two-Way Fixed Effects Model on Industrial Worker Productivity (cUSD 2015)

	(1)	(2)	(3)	(4)
Manufacturing Exports to China	3,692.971	-8,945.509**	1,627.954	-8,714.173*
	(7,989.536)	(4,536.957)	(9,353.836)	(5,045.075)
BRI	-5,049.710**	-1,746.453**	-5,093.252**	-1,740.572**
	(2,431.612)	(787.086)	(2,421.255)	(771.823)
Manufacturing Exports to China x BRI			4,813.281	-582.700
			(8,178.440)	(3,299.272)
Human Capital		8,120.985		8,217.834
		(6,147.796)		(6,042.156)
Urban Growth		613.946*		617.424*
		(360.665)		(363.596)
Government Consumption		-709.729**		-704.449**
		(335.921)		(324.142)
Gross Capital Formation		-139.369		-140.083
		(123.535)		(124.276)
Total Imports from China		-2,638.374		-2,612.890
		(5,966.120)		(5,966.829)
GDP per Capita		3.780***		3.783***
		(0.862)		(0.868)
Labor Rate		-776.066		-776.693
		(543.888)		(545.007)
Primary Sector Imports from China		-32,707.760		-32,538.670
		(22,585.950)		(22,648.270)
R^2	0.017	0.503	0.019	0.503

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

This study analyzes the effect of manufacturing exports to China on foreign economies' industrialization, comparing BRI-participating countries to those without formal BRI agreements. Table 15 concludes that manufacturing exports to China negatively influence industrial worker productivity in BRI and non-BRI participating countries. Additionally, the results support H_7. The BRI amplifies the negative effect of manufacturing exports to China on industrialization, indicating a more significant decrease in worker productivity in BRI-participating countries.

Table 16 **s**hows the estimates from two-way fixed effects panel models on industrial worker productivity. The first model estimates the effects of inward FDI stock from China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of inward FDI stock from China on industrial worker productivity. Additionally, industrial worker productivity in countries participating in a BRI agreement is $4,982 smaller when controlling for inward FDI from China ($p<.05$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, a one percent increase in inward FDI stock from China is associated with a $16,606 decrease in industrial worker productivity, all else constant ($p<.05$). Model 3 estimates the interaction between inward FDI from China and BRI participation in a simple model. According to Model 3, there is no effect of inward FDI stock from China on industrial worker productivity. Model 4 re-estimates the interaction when controlling for a large set of covariates. Inconsistent with Model 3, there is a negative correlation between inward FDI stock from China and industrial worker productivity in non-BRI participating countries ($p<.01$), all else constant. Likewise, for every one percent increase in inward FDI stock, there is a $13,436 decrease in industrial worker productivity in BRI participating countries, all else constant ($p<.001$).

Table 16: Two-Way Fixed Effects Model on Industrial Worker Productivity (cUSD 2015)

	(1)	(2)	(3)	(4)
Inward FDI Stock from China	4,265.779	-16,605.710**	3,139.385	-17,529.340***
	(10,595.910)	(6,793.173)	(8,723.819)	(6,794.630)
BRI	-4,981.629**	-1,718.888**	-5,141.669**	-1,849.561**
	(2,335.892)	(774.523)	(2,339.538)	(745.911)
Inward FDI Stock from China x BRI			4,765.687	4,093.581
			(8,211.891)	(4,565.557)
Human Capital		9,161.577		8,700.549
		(6,403.922)		(6,392.086)
Urban Growth Rate		531.953		522.067
		(336.827)		(334.378)
Government Consumption Rate		-636.817**		-617.667*
		(317.746)		(322.729)
Gross Capital Formation		-124.105		-128.176
		(119.536)		(119.296)
Total Imports from China		-2,395.281		-2,277.408
		(5,886.225)		(5,826.082)
GDP per Capita		3.901***		3.908***
		(0.867)		(0.869)
Labor Rate		-901.582		-874.673
		(549.307)		(550.276)
Primary Sector Imports from China		-22,923.080		-23,154.960
		(15,903.610)		(15,851.280)
R^2	0.017	0.516	0.018	0.517

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

The findings from Table 16 support H_5. Inward FDI from China negatively correlates with industrial worker productivity among BRI countries and those outside the BRI umbrella. The results include developed and less developed countries.

This study examines the impact of Chinese inward FDI on industrial worker productivity of foreign economies, comparing BRI participating countries with those without formal BRI agreements. Table 16 concludes that inward FDI stock from China negatively affects industrial worker productivity in both groups of countries. However, the results fail to support H_7. The BRI suppresses the negative effect of inward FDI from China on industrialization in non-BRI participating countries, showing less of an impact on industrial worker productivity in BRI participating countries.

Table 17 **s**hows the estimates from two-way fixed effects panel models on industrial worker productivity. The first model estimates the effects of outward FDI stock to China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of outward FDI stock on industrial worker productivity. Additionally, industrial worker productivity in countries participating in a BRI agreement is $4,395 smaller when controlling for outward FDI to China ($p<.05$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, there is no effect of outward FDI stock on industrial worker productivity, all else constant. Model 3 estimates the interaction between outward FDI stock to China and BRI participation in a simple model. According to Model 3, there is a positive correlation between outward FDI stock to China and industrial worker productivity ($p<.1$). Model 4 re-estimates the interaction when controlling for a large set of covariates. According to Model 4, there is no effect of outward FDI stock to China on industrial worker productivity in non-BRI and those with formal BRI agreements, all else constant.

The findings from Table 17 fail to support H_6. Outward FDI stock to China has no effect on industrial worker productivity. The results include developed and less developed countries.

Table 17: Two-Way Fixed Effects Model on Industrial Worker Productivity (cUSD 2015)

	(1)	(2)	(3)	(4)
Outward FDI Stock to China	22,754.600	4,118.026	24,736.260*	6,723.109
	(14,080.120)	(4,479.376)	(14,903.070)	(6,711.039)
BRI	-4,394.933**	-1,878.861**	-4,621.020*	-2,227.213**
	(2,174.514)	(776.005)	(2,667.525)	(1,077.761)
Outward FDI Stock to China x BRI			-4,871.874	-6,902.221
			(17,301.850)	(9,012.805)
Human Capital		7,448.531		9,550.605
		(6,350.345)		(6,579.329)
Urban Growth		561.528		578.771
		(352.473)		(353.449)
Government Consumption		-734.031**		-697.303**
		(345.898)		(335.440)
Gross Capital Formation		-119.916		-103.534
		(121.850)		(111.417)
Total Imports		-2,301.902		-2,772.978
		(6,473.774)		(6,508.161)
GDP per Capita		3.677***		3.673***
		(0.831)		(0.823)
Labor Rate		-800.269		-806.287
		(530.879)		(531.079)
Primary Sector Imports from China		-30,569.140		-28,209.000
		(23,800.770)		(23,887.180)
R^2	0.058	0.501	0.060	0.504

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

This study examines the impact of outward FDI stock on China's industrialization of foreign economies, comparing BRI participating countries to those without formal BRI agreements. Table 17 concludes that there is no effect of outward FDI stock on both groups of countries. The findings fail to support H_7.

Table 18 **s**hows the estimates from two-way fixed effects panel models on industrial worker productivity. The first model estimates the effects of primary sector materials to China on whether a country actively participates in a BRI agreement. According to Model 1, there is no effect of primary sector materials to China on industrial worker productivity. Additionally, industrial worker productivity in countries participating in a BRI agreement is $4,948 smaller when controlling for primary sector exports to China ($p<.05$). Model 2 estimates these effects when controlling for a large set of covariates. According to Model 2, primary sector exports to China has no effect on industrial worker productivity, all else constant. Model 3 estimates the interaction between primary sector exports to China and BRI participation in a simple model. According to Model 3, there is no effect of primary sector exports to China on industrial worker productivity. Model 4 re-estimates the interaction when controlling for a large set of covariates. Consistent with Model 3, there is no effect of primary sector exports to China on industrial worker productivity in non-BRI participating countries, all else constant. However, those with formal BRI agreements show a negative correlation between primary sector exports to China and industrial worker productivity, all else constant ($p<.01$). This study utilizes a simultaneous test package (multcomp) to test the interaction effect in the analysis, yielding more robust significance values for BRI-participating countries (see Table 19).

The findings from Table 18 find partial support for H_3. Primary sector exports to China negatively affect industrial worker productivity in BRI-participating countries. The results include developed and less developed countries.

Table 18: Two-Way Fixed Effects Model on Industrial Worker Productivity (cUSD 2015)

	(1)	(2)	(3)	(4)
Primary Sector Exports to China	-7,264.572	-2,632.267	-5,384.877	-65.401
	(7,292.646)	(7,705.923)	(6,947.643)	(6,967.295)
BRI	-4,948.094**	-1,899.194**	-4,746.483**	-1,558.143**
	(2,332.098)	(784.097)	(2,323.190)	(729.328)
Primary Sector Exports to China x BRI			-5,832.806	-8,620.729**
			(4,525.083)	(4,249.693)
Human Capital		8,139.380		8,456.043
		(5,969.266)		(6,064.483)
Urban Growth		571.444		657.113*
		(352.777)		(365.442)
Government Consumption		-717.004**		-719.202**
		(337.889)		(337.077)
Gross Capital Formation		-122.107		-135.040
		(123.850)		(124.358)
Total Imports		-3,531.524		-4,711.760
		(5,806.538)		(5,488.364)
GDP Per Capita		3.730***		3.760***
		(0.858)		(0.860)
Labor Rate		-825.533		-894.847
		(539.280)		(544.077)
Primary Sector Imports from China		-31,523.440		-32,057.380
		(23,754.820)		(23,279.900)
R^2	0.019	0.500	0.022	0.505

Note: Observations = 1,355. Robust clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<.1

This study examines the impact of primary sector exports to China on the industrialization of foreign economies, comparing BRI participating countries with those without formal BRI agreements. Table 18 concludes that primary sector exports to China negatively affect industrial worker productivity in countries with formal BRI agreements. The results partially support H_7. The BRI amplifies the adverse effect of primary exports to China on industrialization. This demonstrates that BRI agreements worsen the negative effects that primary exports to China have on industrial worker productivity when compared to countries not participating in the BRI.

Figure 9 shows predicted values for each central coefficient on industrial worker productivity. Panel 1 details the effects of manufacturing imports from China on industrial worker productivity and shows how the BRI amplifies the decrease in worker productivity compared to non-BRI countries. This occurs at the onset of imported manufactured goods from China. The second panel depicts how increasing manufacturing exports to China affects productivity. Increasing manufacturing exports to China reduces worker productivity, and this negative effect is the same between BRI and non-BRI countries at early levels of exports to China. Panel 3 shows inward FDI from China on industrial worker productivity. When inward FDI increases by more than 0.25 percent, the BRI suppresses the negative effect inward FDI stock has on industrial worker productivity. The fourth panel highlights the impact of outward FDI stock on China's industrial worker productivity. At early increases in outward FDI stock, non-BRI countries show an increase in industrial worker productivity compared to BRI participating countries, which show a marginal decrease in worker productivity. The last panel depicts the effects of primary sector exports to China on industrial worker productivity. Early increases in primary sector exports lead to significant decreases in industrial worker productivity in BRI countries. However, industrial worker productivity is unaffected by increases in primary sector exports to China in non-BRI countries.

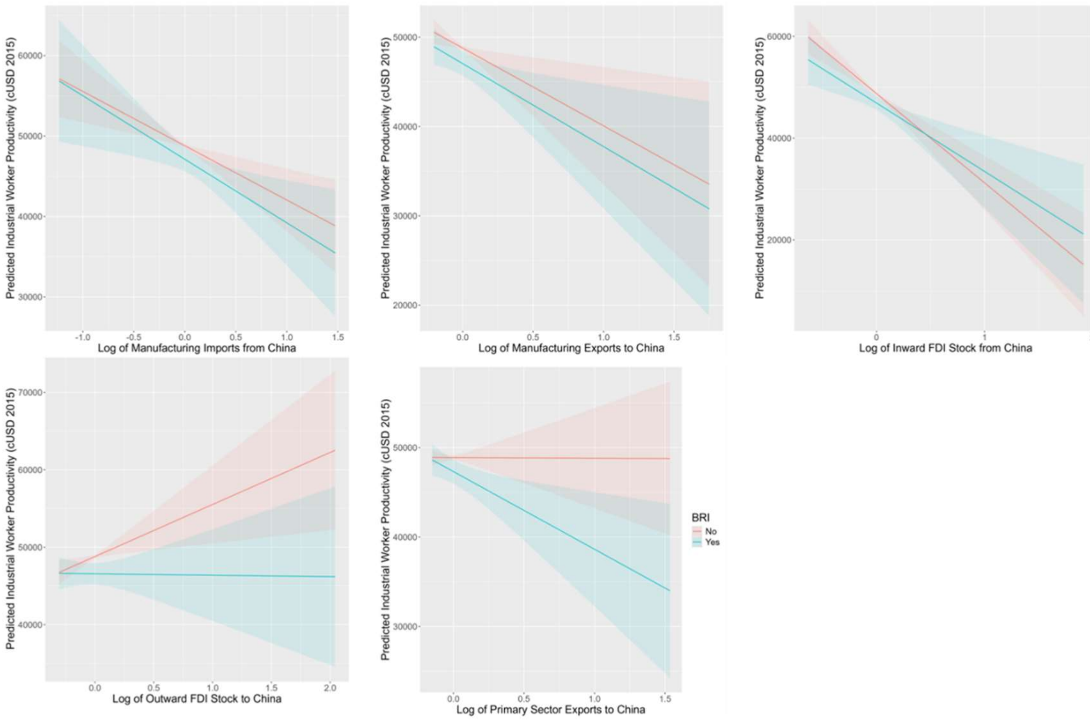

Figure 9: Plot Prediction on Industrial Worker Productivity

4.4 Comparing the Effects of Chinese Trade and Investment in BRI and Non-BRI Countries

Table 19 compares the effects of Chinese trade and investment on each indicator of industrialization amongst countries in BRI agreements and countries not participating in an agreement. The BRI column provides the marginal effects of Chinese trade and investment based on the interaction models reported above (column four in Tables 3-17). The non-BRI column provides the marginal effects of Chinese trade and investment based on the reported coefficients in the above interaction models. The purpose is to show the quantitative differences in the effects between BRI and non-BRI countries. Overall, the results show substantial differences between BRI and non-BRI countries.

Table 19: Comparison Table of the Effects between BRI and Non-BRI Countries on Industrialization

	Size of Industrial Labor Force		Size of the Industrial Sector		Industrial Worker Productivity (cUSD 2015)	
	Non-BRI	**BRI**	**Non-BRI**	**BRI**	**Non-BRI**	**BRI**
Manufacturing Imports from China	1.34*	3.00***	-0.24	2.05*	-6,748.93	-7,899.00**
	(0.65)	(0.50)	(0.75)	(0.80)	(5,720.74)	(2,852)
Manufacturing Exports to China	0.39	2.27***	0.30	0.06	-8,714.17'.'	-9,297.00**
	(1.08)	(0.62)	(1.81)	(0.98)	(5,045.08)	(3,504)
Inward FDI Stock from China	-0.23	2.50***	-1.46	3.65***	-17,529.34*	-13,436.00***
	(0.73)	(0.65)	(1.28)	(1.03)	(6,794.63)	(3,654)
Outward FDI Stock to China	-2.68**	-2.01***	0.90	1.8*	6,723.11	-179.10
	(0.85)	0.50	(1.56)	(0.80)	(6,711.04)	(2847.1)
Primary Exports to China	-0.42	0.03	0.01	-1.57'.'	-65.40	-8,686.00**
	(1.14)	(0.58)	(1.99)	(0.91)	(6,967.30)	(3,239)

Note: Robust Clustered Standard Error in parentheses. ***p< 0.001, **p<.01, *p<0.05, '.' p<0.1

The size of the industrial labor force represents the employment within the industry in each country as a percent of total employment. Notably, manufacturing imports from China increase the industrial labor force in both groups of countries. This contradicts findings that show the negative impact China Shock has on foreign economies industrial employment. Regarding Chinese imports and exports, the BRI amplifies the positive effects of trade on industrial employment, where a unit increase in trade increases industrial employment by 3.00 (p<.001) and 2.27 (p<.001) percent, respectively.

Interestingly, Chinese FDI has mixed results in terms of industrial employment. For non-BRI countries, inward FDI has no effect on industrialization. Inward FDI from China notably increases the industrial workforce by 2.50 percentage points (p<.001). Countries that invest and have multinational corporations in China have an adverse effect on industrial employment by -2.68 percent for non-BRI participants for every one percent increase in outward FDI to China (p<.01). The BRI suppresses the negative effects of outward FDI stock to China on industrial employment which counters the initial assumption in this study. Overall, the size of the industrial labor force is positively influenced by BRI trade agreements.

The literature stresses the importance of industry, specifically manufacturing, in countries' ability to continue steady economic growth (Haraguchi et al., 2017). This analysis compares the effects of formal trade agreements on the size of the industrial sector as a percent of gross domestic product (GDP), which further assists in developing a comprehensive outlook on how effects can differ between BRI and non-BRI countries. This comparison shows that there are no effects of Chinese trade and investment on the size of the industrial sector in non-BRI participating nations. However, BRI agreements amplify the positive effects of manufacturing imports from China, inward FDI stock from China, and outward FDI stock to China on the size of the industrial sector. However, BRI agreements amplify the negative effects of primary sector exports on the size of industry. This may indicate that bilateral relations spur economic activity in countries with formal BRI agreements. Although, countries who focus on the primary sector hinder industrial growth.

Industrial productivity, the individual's value-added as a net output per worker, describes how efficiently and productive goods and services are produced in an economy. The data shows a significant shift from the previous two indicators of industrialization in that BRI agreements have a positive impact on countries' economies. The BRI amplifies the negative effects of participating countries' imports and exports on industrial productivity, decreasing productivity by -\$7,899 ($p<.01$) and -\$9,297 ($p<.01$), respectively. The analysis shows that the BRI suppresses the adverse effect of inward FDI from China on industrial worker productivity. For non-BRI countries, there is a decrease of \$17,529 in value added per worker for every one percentage point increase in FDI from China ($p<.05$). The BRI suppresses the negative effect, reducing industrial worker productivity by \$13,436 for every one percent increase in FDI from China ($p<.001$). Furthermore, participating in the BRI trade agreement suppresses the positive effect of outward FDI to China on worker productivity. Interestingly, the BRI amplifies the negative effect on industrial worker productivity, showing that a one percentage point increase in primary exports to China reduces industrial worker productivity by -\$8,686 ($p<0.01$). The effects of the BRI on industrial worker productivity are overwhelmingly negative, except for suppressing negative effects of inward FDI stock. This may signal a shift in industrial activities as BRI countries get integrated into the globalization of production and China offloads labor intensive low-value-added segments of the industrial sector.

4.5 Summary

The regression results confirm several hypotheses in Chapter 2 that align with existing literature on how Chinese trade and investments impact global industrialization. However, the analysis also suggests that it deviates from some of the traditional China Shock literature. The next section will describe how Chinese trade and investment affect industrialization, as gathered from the results in this chapter.

The findings from this analysis provide an interesting story of how Chinese trade and investment affect foreign economies' industrialization. When considering employment in the industrial sector and the size of the industrial labor force, this analysis shows that bilateral relations with China support growth within these two indicators of industrialization. Interestingly, BRI countries benefit significantly more than those outside the BRI's umbrella due to the nature of their bilateral agreements with China. Even in the case of outward FDI to China, BRI agreements mitigate its negative impact on industrial employment. By reducing trade barriers and enhancing economic efficiencies between host nations and China, the Belt and Road Initiative agreements generally lead to improved outcomes for Chinese trade and investment and their effect on these two indicators of industrialization.

The third indicator and most exciting finding from the analysis is how Chinese trade and investment affect industrial worker productivity. Overall, Chinese trade and investment negatively impact industrial worker productivity in BRI participating countries. However, BRI agreements seem to exacerbate these adverse effects, suggesting that they significantly reduce productivity levels compared to those not in formal agreements. These agreements' economic nature could help China in offshoring and outsourcing some of its labor intensive, low-end manufacturing industries to less developed countries. Offshoring from China enables companies to revitalize industrial activity, but it may pigeonhole countries into specific manufacturing segments, perpetuating low worker productivity within the industrial sector. This can be especially troublesome if these countries are part of global production chains, which may further hinder long term economic growth. Additionally, this could indicate that China is encouraging BRI countries to focus on their primary sector, potentially reducing productivity in the industrial sector.

Chapter 4 provides results from Chinese trade and investment on the identified indicators of industrialization: industrial employment, the size of the industrial sector, and industrial worker productivity. The mixed results reflect the complexities of how Chinese trade and investment interact with foreign economies. Furthermore, it may signal Chinese dominance as a global trading partner, foreign economies' reliance on bilateral trade and investment relations with China, and China's maturation in the industrial sector. The study concludes in the following section, highlighting limitations and offering recommendations for future research.

Chapter 5 – Discussion and Conclusion

The Belt and Road Initiative is a globalization project spearheaded by China to further integrate China into the world economy through trade and investment. However, it is unclear how the expansion of Chinese trade and investment has impacted the industrialization of developed and less developed countries under BRI agreements. This thesis investigates how participation in the BRI moderates the effects of Chinese trade and investment on industrialization. By analyzing industrial employment, the size of the industrial sector, and industrial productivity, this study shows how Chinese trade and investment impact industrialization in developed and less developed nations. Additionally, the results show that BRI agreements influence how Chinese trade and investment impact foreign economies.

The initiative was first introduced in 2013 and has since grown with cooperation agreements with roughly 147 countries. BRI agreements are designed to facilitate trade and investment between China and cooperating nations by reducing trade and investment barriers. The agreements also formalize bilateral relations between participating countries and China, laying the groundwork for future economic collaboration. As a result of the BRI, China has gained considerable influence over the global economy.

There are noticeable differences in industrialization trends between developed and less developed countries. Manufacturing is becoming increasingly fragmented across the globe, where manufacturers produce specific segments or products in a production chain before exporting to the final stage of the process. Developed countries, including China, seem to offshore labor-intensive, low-end manufacturing segments to less developed nations. Additionally, investment through multinationals and offshoring manufacturing processes contribute to deindustrialization in developed countries. Less developed countries benefit from offshoring manufacturing segments through increased employment and industrial growth. However, prioritizing manufacturing sectors and importing essential raw materials can hinder economic growth and limit future expansion. As a global industrial leader and major exporter, China significantly influences foreign economies in an increasingly interconnected global economy.

Developed countries are experiencing deindustrialization, which leads to decreased industrial employment and sector growth. Conversely, less developed countries are seeing increased industrial activity, which increases industrial employment, productivity, and development. Currently, there seems to be a divide in how Chinese trade and investment impact foreign economies, highlighting that this globalization effort may not be a true win-win scenario for every nation. Analyzing how China affects foreign economies' industrialization can help pinpoint the contributing factors leading to decreases in the industrial sector. This is critical because the industrial sector is crucial for sustainable economic growth in developed and less developed nations. Given China's recent economic ascension as a global production leader, this thesis analyzes how China affects industrialization in developed and less developed countries.

China remains a vital part of the global economy, and trade and investment extend beyond BRI partners. Formal agreements under the BRI umbrella assist in lowering trade barriers and increase bilateral cooperation between participating nations and China. However, it is also critical to note that China’s trade and investment affect industrialization in countries that do not participate in active BRI agreements. The economic nature of BRI agreements can potentially enhance the effects resulting from increased bilateral cooperation between two countries. Notably, the literature is limited on how BRI agreements moderate the effects of Chinese trade and investment. It is essential to analyze BRI agreements because issues, such as decreasing worker productivity, can be exacerbated by BRI agreements. This thesis examines the impact of the BRI on both developed and less developed nations and its potential to enhance the effects of Chinese trade and investment on industrialization.

5.1 Summary of Findings

Overall, this study demonstrates that Chinese trade and investment generally increase industrial employment and value-added while showing significant decreases in worker productivity. Specifically, trade increases value-added and employment in the industrial sector, while investment in China has mixed results. However, the findings also show that Chinese trade and investment negatively impact labor productivity in the industrial sector. Interestingly, the BRI moderates these effects to different degrees, highlighting the differences between BRI-participating countries and those not actively involved in BRI agreements.

Manufacturing exports and imports with China increase the size of the industrial labor force. This contrasts several studies that conclude China Shock negatively impacts manufacturing employment (Autor et al., 2014; Moreira et al., 2023). One reason for the industrial sector's growth is that trade increases can signal expansion. Increased manufacturing exports correlate to increases in domestic production, and in the past decade, China has shown increased trade activity in parts and components with BRI countries (Yang & Lin, 2021). China's outsourcing of some production processes to less developed nations stimulate economic activity, generates jobs, and fosters growth in the industrial sector. In this scenario, the increase in imports from China contributes to employment and industrial growth by integrating countries into the global value chain, increasing labor demand within foreign economies while decreasing entry barriers.

Chinese investment effects on industrialization are mixed. Inward FDI from China can yield positive effects, such as technology, information, and demonstration spillover effects from domestic economies collaborating with Chinese multinational corporations. This can explain the benefits BRI countries receive with increased Chinese investment. However, outward FDI decreases the size of the industrial labor force.

The impact of Chinese trade and investment on industrial worker productivity requires further investigation. Notably, Chinese trade and investment negatively impact worker productivity, which contrasts with the findings of several scholars, who have suggested that Chinese trade and investment positively impact worker productivity within the sector (Borojo & Jiang, 2016; Darko et al., 2021). China could be offshoring labor intensive low value added segments of the production process to other countries, decreasing worker productivity. Labor demand within these low-end segments may cause countries to focus on these low-end industries and forego the natural progression of industrialization. Additionally, Chinese investment may lead to the primarization of foreign economies, shifting labor and growth to the primary sector, and potentially reducing productivity in the industrial sector. Scholars note China's increased need for raw materials (Grimoux, 2018), which would contribute to this study's findings.

Moreover, BRI agreements amplify positive effects on manufacturing imports and exports with China, leading to increased growth in the industrial labor force in BRI participating countries. This could be attributed to imports and exports stimulating labor demand among domestic firms, whereas BRI countries have more trade with China. Furthermore, inward FDI stock from China positively affects the industrial labor force in BRI countries. Specifically, BRI agreements mitigate the negative impact of Chinese investment on employment and the size of the industrial sector, indicating that BRI participant countries experience better outcomes than non-participating countries. Formalized agreements and the economic nature of BRI contracts may facilitate better terms for host nations, increasing the positive benefits of investment with China. While the initial findings are mixed on whether Chinese trade and investment positively impact the industrial labor force, BRI countries benefit more than those without formal agreements in employment and growth in the industrial sector.

This study's results show that countries with BRI agreements have increased negative effects from Chinese trade and investment on worker productivity, with the exception of suppressing the negative effect from inward FDI. BRI agreements may help facilitate offshoring from China, which may explain the increased negative effects of trade with China. Additionally, formalized trade relations may shift efforts towards the primary sector, which scholars note decreases productivity and is detrimental to industrialization (Jenkins, 2015; Kaya, 2010; Rodrik, 2017). Decreased industrial productivity could signal a warning down the line if countries fail to reverse the trend.

The findings highlight the effect Chinese trade and investment have on foreign economies. In general, Chinese trade benefits countries whereas investment has mixed results on industrialization in other economies. The exception is industrial productivity, where BRI countries exhibit lower productivity levels than their non-BRI counterparts, minus inward FDI's effect on productivity. This could signal a severe issue, as Rodrik (2017) notes that increasing worker productivity in this sector is critical to continuing economic growth, given the current climate of the global economy. Additionally, the BRI amplifies and suppresses the negative and positive effects of Chinese trade and investment in industrialization, prompting further research into the specific characteristics of BRI agreements that influence Chinese trade and investment effects on industrialization.

5.2 Limitations and Recommendations for Future Research.

Several limitations within this study may warrant future attention. This study analyzes overall manufacturing imports and exports with China. There is available information within COMTRADE databases to identify industries under the manufacturing sector. This type of analysis would account for inter-industry variations in the effects of Chinese trade and investment between BRI and non-BRI participating countries, which would help in identifying whether Chinese trade and investment is promoting labor-intensive industrialization. Identifying which industries are spurring economic activity in BRI countries will help identify what parts of the production processes are being offloaded.

Notably, the negative relationship between Chinese trade and investment on worker productivity should signal caution to foreign economies willingness to participate in the BRI and increase trade and investment with China. The world economy is increasingly becoming fragmented, and global value chains are beginning to dominate the production process. Consequently, the results of this study may indicate that China could be offshoring many labor intensive, low-value added segments of the production process to foreign countries. This may be more prevalent in BRI-participating countries, as shown by the significant decreases in industrial worker productivity. If these industries are falling victim to globalized production chains, especially if export focused economies import inputs to their production process, then identifying trends to alleviate issues that lead to deindustrialization will greatly benefit emerging economies. Future research should be considered to identify which industries within the manufacturing sector, or what type of foreign investment, decrease worker productivity and whether China is exporting inputs to foreign production process.

Another limitation of this study is that we did not include specific details about BRI agreements. This study only analyzes whether countries are participating in BRI agreements. Understanding the content of BRI agreements can help identify indicators that enhance or hinder how Chinese trade and investment impact industrialization in foreign economies. The complexity of how the BRI moderates the effects of Chinese trade and investment warrants future attention. Compared to their non-BRI counterparts, countries involved in the BRI receive more benefits from Chinese trade and investment, particularly regarding its positive effect on industrial employment and sector size. Formalized BRI agreements may significantly decrease trade and investment barriers and promote industrial activity within participating countries. Additional research may be warranted to explicitly identify what types of agreements positively affect industrial employment and industrial sector growth.

Lastly, this thesis analyzes total FDI between China and foreign economies. FDI flows are invested into various sectors of the economy, so analyzing different sectors can help pinpoint the specific type of FDI causing adverse effects. FDI flows into the primary sector will orient economies away from industrialization. Economies that focus on the primary sector lose out on technological gains and reliable growth industrialization can facilitate. Even if there is an economic gain, long-term economic growth is unreliable compared to industrializing countries.

Furthermore, China may leverage foreign countries' primary sector, contributing to deindustrialization. Kaya (2010) finds that FDI flows into the primary sector lead to decreased manufacturing employment. Export primarization also amplifies the effects of deindustrialization (Jenkins, 2015), capping less developed countries' growth potential within the sector. Considering the negative relationship between Chinese trade and investment in industrial worker productivity, I recommend thoroughly analyzing this complex issue. Specifically, what factors of Chinese trade and investment have such detrimental impacts on worker productivity?

Additionally, I would recommend researching which types of BRI agreements amplify these adverse effects.

5.3 Conclusion

This study complements the existing literature on how China, a global industrial competitor, affects industrialization in developed and less developed nations. Advancing this research will help pinpoint specific factors contributing to the advantages and disadvantages of enhancing economic ties with China. This can help shape foreign economic policies as countries navigate the development of a healthy industrial sector in an increasingly fragmented global economy. This may significantly affect less developed nations, considering that decreases in industrial worker productivity can harm steady economic growth and potentially lead to premature industrialization. Moreover, analyzing the BRI agreements will provide insight into the targeted industries and their impacts on industrialization.

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