ASSESSING THE IMPACT ON EMPLOYMENT LEVELS IN CORRIDOR COUNTRIES OF THE BELT & ROAD INITIATIVE

Johnson, Henry

Universiteit Leiden

ASSESSING THE IMPACT ON EMPLOYMENT LEVELS IN CORRIDOR COUNTRIES OF THE BELT & ROAD INITIATIVE

Henry Johnson
s1813358

Submitted to: Prof. Dr. Olaf van Vliet

Thesis Submitted in Partial Fulfilment of
the Requirements for a Major and Degree in
Economics and Governance,
Public Administration
Master of Science (MSc)

2021

ABSTRACT

This thesis examines the impact of the Belt & Road Initiative on employment rates within corridor countries that are participating in the global infrastructure project. It uses difference-in-difference estimation to test cross-country panel data on employment rates and identify trends to employment associated with Belt & Road participation. Building on the knowledge and theory established by previous studies of the Belt & Road and reports related to infrastructure investment and development, it analyzes the relationship between infrastructure and employment within the framework of the Belt & Road Initiative. The effect of the Belt & Road Initiative on employment is first assessed on participating corridor countries at an overall level before separately assessing its effect on employment rate growth at each level of income group.

Acknowledgments

I would like to express my appreciation for my supervisor Prof. Dr. Olaf van Vliet, for his time and guidance throughout the writing process of this thesis. I would also like to express my gratitude to my professors and teachers, at all levels throughout my academic career, who have stimulated my learning and contributed towards my education and understanding of the World in a meaningful way. I thank my close friends and family for their ever loving support and motivation. Last but certainly not least, I would like to thank my parents for providing me with the tools to succeed, a great education and the fortune of living abroad throughout my education in countries and schooling systems from where I have gathered so much of my knowledge and life experiences. - December, 2021

TABLE OF CONTENTS

1 Introduction 4
- 1.1 Background of the Belt & Road Initiative . . . 4
- 1.2 Research Gap & Motivation . . . 5
- 1.3 Aim of the Study . . . 6
- 1.4 Scope of Study . . . 7
- 1.5 Overview . . . 8

2 Literature Review 9
- 2.1 Previous Studies on Impact of BRI . . . 9
- 2.2 Positive Impact From BRI . . . 9
- 2.3 Negative Impact & Risks Associated with BRI . . . 12
- 2.4 Mechanisms & Policies For BRI Employment Success . . . 13

3 Infrastructure Development Theory 14
- 3.1 Infrastructure Investment & its Relationship to Employment . . . 14
- 3.2 Indirect vs Direct Employment & the Multiplier Effect . . . 15
- 3.3 The Factor of Income . . . 16
- 3.4 Hypotheses . . . 17

4 Research Methodology 19
- 4.1 Research Design & Data Collection . . . 19
- 4.2 Operationalization & Method of Analysis . . . 20
- 4.3 Methodological Choice . . . 23

5 Empirical Results & Analysis 24
- 5.1 Descriptive Statistics . . . 24
- 5.2 Total Impact . . . 24
- 5.3 Impact by Income Group . . . 25
- 5.4 Analysis . . . 26
- 5.5 Limitations & Future Research . . . 29

6 Conclusion 30

1 INTRODUCTION

1.1 Background of the Belt & Road Initiative

Infrastructure is an essential foundation for economic development. No fully developed country has been able to grow its economy without it. In China there's a saying that, "if you want to get rich, first build a road" (Zhou & Ghiasy, 2017). Born from the idea of building a new and modern silk road, China's Belt and Road Initiative is a transnational and transcontinental infrastructure program that is being heralded as the largest international development and infrastructure project of the twenty-first century. Inspired by this vision to revive the economic glory trade routes of the revered ancient Silk Road brought, President Xi Jinping of the People's Republic of China, presented the strategic framework for the initiative in 2013 (Johnson, 2016). It included a plan for the joint building of a 'Silk Road Economic Belt' that links China with Asia, Africa and Europe via a belt of six overland corridors in addition to a counterparting '21st Century Maritime Silk Road' of shipping lanes and networks connecting China all the way to Europe via sea (European Bank for Reconstruction and Development, 2020). Together, the Silk Road Economic Belt and 21st Century Maritime Silk Road forged what was referred to in Chinese parlance as 'One Belt, One Road' (OBOR) before later officially being coined the 'Belt and Road Initiative' (BRI) (Stockmann, 2019). The Belt and Road Initiative (hereafter BRI) has huge global implications for the World economy. If realized, it is believed that it would directly affect and benefit a population of 4.4 billion people that is roughly 63 percent in terms of global population (Johnson, 2016). The significance and size of this project cannot be ignored, particularly in terms of its ability and potential to help countries overcome poor levels of physical and social infrastructure. It will serve as a stimulus for global employment growth within the new markets that it stretches out to and creates connectivity with.

Targeting both global and regional infrastructure development, the aim of the initiative is to stimulate economic growth, expand trade, and improve regional integration by accelerating the economic development and infrastructure connectivity of countries along the Belt and Road corridors with China (European Bank for Reconstruction and Development, 2020). China's motivation for funding the BRI is pushed not only by the desire to strengthen and sustain their global economic influence, but to address the nation's excess industrial capacity at home (Cai, 2017). From the connection of the country via a series of economic corridors to further neighbouring regions, China is able to supply construction and expand its economic influence in places where there is a demand for the development of infrastructure (ibid.). The idea is that the financing for investment, in addition to the implementation capacity, for the infrastructure projects are provided by China through loans that are borrowed to Belt and Road countries. In return China receives domestic benefits of its own from alleviating areas of its industrial overcapacity by exporting its infrastructure investment abroad. This comes in addition to the future financial gains China will receive from reduced transport costs, trade and increased cooperation in these newly tapped markets (Vadlamannati et al., 2019). Among the infrastructure

projects invested in include the construction of deep-water ports, railway networks, gas pipelines, telecommunication networks, power plants and major roads etc, in BRI participating countries (Johnson, 2016). The majority of BRI projects can be categorized into sectors of transportation, energy, and information technologies and communications (Rolland, 2019). Though BRI investment is not limited to hard infrastructure only, it also includes soft infrastructure such as trade agreements, special economic zones, reduced tariffs, tourism and other "people-to-people" ties such as education, job training and university scholarships (Hillman, 2018).

1.2 Research Gap & Motivation

The BRI is viewed as one of the answers to the developing World's infrastructure needs as it naturally places a major focus on countries and regions considered to be comprised of 'emerging markets' by building along areas of the ancient Silk Road that includes countries in Central Asia, Eastern Africa, Eastern Europe and the Middle East (Vadlamannati et al., 2019). Existing levels of poor physical and social infrastructure within the economies of emerging markets is well documented. Infact, a large share of the United Nations' development goals are connected to and rely on the improvement of infrastructure. This is emphasized by the Asian Development Bank, estimating that Asia itself holds a USD $26 trillion dollar funding gap for infrastructure that it requires till 2030 (ADB, 2017). The World Bank reports that the resulting cost of existing ill-serving infrastructure for countries lying on the Belt and Road corridors is that they undertrade by 30 percent and fall 70 percent short of their potential FDI (Foreign Direct Investment) (World Bank, 2019). New economic corridors built from the BRI have the potential to substantially improve trade and FDI as well as the overall living conditions for citizens within participating BRI countries from the economic growth that is stimulated by helping to plug the infrastructure gap (ibid.).

Though, what is less examined in discussion of the BRI is the initiative's prospective capacity to address the increasing demand and necessity to create employment throughout the various regions it is operating within as a result of the infrastructure development it brings. This is evident in places where there is a surge amongst the young adult working population, which is the case for a large share of BRI participating countries located along the economic corridors. Nowhere else will the challenge of employment creation be so critical than among the countries that line the Silk Road economic corridors of the BRI of whom a majority possess increasingly expanding labour forces. If left unaddressed, unemployment and demand for jobs in countries with emerging economies and already existing poor levels of physical and social infrastructure can lead to migration crises and contribute to political and social instability driven as a result of the working population's economic insecurity (Kanak, 2016). Countries in Central Asia, Southeast Asia, Africa, and the Middle East, face perhaps "the greatest short-term job creation challenge in World history" with a predicted labour force increase of approximately 382 million people over the next fifteen years (Kanak, 2016). Employing the amount of people expected to

join the labour force of emerging markets within countries operating in the BRI will require the creation of more jobs. The BRI initiative has the potential to help relieve economic insecurity around employment. This aims to be achieved by stimulating and accelerating investment into infrastructure projects that will improve economic development and close employment gaps through job creation.

Most of the research that has been conducted at the economic level assessing the potential impact of the BRI on participating countries has been based on measuring outputs of economic growth related only to GDP, FDI, or trade. A large chunk of these recent studies are also limited to single case studies that assess a particular BRI corridor country or small-N cross comparison case studies between two regional BRI countries and the effects on economic development in relation to the implementation of the BRI. Remarkably what the literature lacks, however, are empirical assessments that focus on and examine to the same extent, the BRI's effects on employment levels in participating countries across the BRI as a whole.

China and other advocates of the BRI claim that the initiative will generate increased employment opportunities within participating corridor countries as a result of the promoted investment and consumption from the funding of infrastructure. According to data from the International Labour Organization (ILO), the employment rate of countries participating in the BRI has experienced an average growth rate of around 0.43 percent since the start of the initiative in 2013 to 2016 (Yue et al., 2018). Though there are many other factors such as, FDI inflow from outside the BRI, level of exposure to globalization and quality of education, to name a few, that could be contributing to an increased employment rate in countries along the BRI, or at least a variability in the changes to employment rates among different participating countries. These other factors that may be contributing to employment rate growth can be accounted for by the income group of a country given their respective level of income. The relative income of a country is a good indicator of a country's level of education, employment opportunities, level of globalization, ratio of urban to rural areas etc, that reflect the socio-economic situation. This can have an influence on employment levels and therefore the overall effect that the BRI is able to have on employment.

1.3 Aim of the Study

The aim of the study is to further the research into the question as to ***whether or not the BRI program significantly increases employment in participating Belt and Road corridor countries, and to what extent is the level of employment growth dependent on a country's income group?***

In an effort to answer this question, this research will collect evidence found from studies and reports that have assessed the impact of the BRI in its relation to employment and the creation of job opportunities in participating BRI countries. It will draw on the theoretical framework found on infrastructure investment from current literature and World development bank reports to

establish the relationship between infrastructure development and employment, and gather evidence of infrastructure's effects on employment in relation to a country's stage of development and level of income. This study anticipates to find that the employment effects are positive for BRI countries and that the effect on employment is greater in countries of higher income. To perform this research, a difference in differences (DID) estimation method will be applied with a treatment group and a control group between countries that are participating in the BRI and those that are not participating, to measure employment rates over time from the introduction of the BRI till present for each of the four country income groups (low income, lower-middle income, upper-middle income and high income). In total 8 groups and 4 sets of DID estimation. By grouping countries this way it can be seen whether the BRI has a more significant effect on employment rates in high, upper-middle, lower-middle or low income countries compared to the employment rate growth in countries of the same income group for non-BRI countries. Panel data containing employment rates for participating BRI corridor countries is collected from the employment statistics found on the ILO's online database.

1.4 Scope of Study

The research will analyze and assess the BRI as a whole and does not provide analysis on participating countries individually. There is no official definition for what qualifies as a BRI infrastructure project, and there are many infrastructure projects that are funded by China in countries who are not 'officially' participating in the initiative, or are part of the initiative but do not lie along one of the corridor 'Belt Roads' of the BRI, as the BRI has an open arrangement in which any country can participate in the development initiative (World Bank, 2019). As of January 2021, statistics from China state that 140 countries have endorsed the project or signed a memorandum of understanding (MoU) (Nedopil, 2021). However, this includes many countries in South America, Oceania and landlocked parts of Africa that have recently become an extension of the BRI, were not part of the project's 2015 official action plan and do not lie along any of the economic corridors that China has identified to develop. This approach would lead to very different and inconclusive results about the effects of the BRI on employment in participating countries. From a geographical perspective, this study will only incorporate those participating countries whose location is in respect to the six overland Belt Road corridors and Maritime Silk Road of the BRI defined initially by China in their 2013 unveiling and 2015 Official Action Plan (See Table 1.4). This study therefore includes a total of 70 corridor BRI participating countries, excluding China, listed in Appendix A along with their corresponding economic corridor. It should also be noted that while the initiative officially began in 2013, commencement of BRI infrastructure development did not occur at the same starting year for all countries along the BRI as some countries had Chinese-funded infrastructure projects start time prior or after this date. Although by restricting the scope of this study to corridor BRI countries, this helps to limit the time variation between the commencement of funding into BRI development.

Furthermore, it is worth acknowledging at this point that whilst there may be an underlying geostrategic component to the BRI that runs concurrently with China's objectives, since the focus of this study is on infrastructure development and employment, this analysis excludes any benefit this may bring and does not consider any geopolitical criticisms when assessing the impact of the BRI.

Table 1.4
Economic Corridors of the BRI
Six overland 'Belt' economic corridors and one maritime 'Road' have been identified:

❖ **Overland**	
1.	*New Eurasian Land Bridge*
2.	*China-Mongolia-Russia Economic Corridor*
3.	*China-Central West Asia Economic Corridor*
4.	*China-Indochina Peninsula Economic Corridor*
5.	*China-Pakistan Economic Corridor*
6.	*China-Myanmar Economic Corridor* (*Prior to April 2019, referred to as Bangladesh-China-India-Myanmar Economic Corridor)
❖ **Sea**	
1.	*21st Century Maritime Silk Road*

Source: World Bank (2019)

1.5 Overview

Following this introduction, chapter two contains a review of the recent literature that has been conducted and reports on findings relevant to the BRI program from other studies to establish what is already known. Chapter three presents theory and explains related concepts to the topic before later on illustrating the hypotheses and presenting what the research expects to find. Prior to data collection, chapter four lays down the research design and methodology that is used to conduct the research and is where the hypotheses are made. Afterwards, chapter five reveals the empirical findings and provides an analysis of the results while examining its implications, as well as limitations to the study ahead of the concluding remarks made in chapter six.

2 LITERATURE REVIEW

2.1 Previous Studies on Impact of BRI

In light of the growing surge in investment spent by China on global infrastructure over recent years, scholars have become increasingly interested in the economic impacts the BRI will bring to the World economy. Thus far, most existing research has focused analysis at a level of overall economic performance that measures the BRI's impact on economic indicators like GDP, GDP per capita, total trade output, or FDI inflow and whether or not the initiative promotes overall economic growth for countries. Though the research is new and because the BRI has only relatively recently been implemented, studies are only able to make strong conclusions based on evidence that show the short-term side of the effects. The initiative's impact on employment growth is perhaps the most varying aspect of analysis on the BRI that either supports or criticizes the BRI's involvement in helping to develop employment opportunities. In reality, the reception and results of the BRI have been quite mixed in some studies, as this tends to be the case in single case studies, compared to studies that analyze the BRI collectively as a whole and give stronger positions of argument. The results and knowledge established by such studies on employment in the BRI can be grouped by the following: It has a positive impact (for example, Yue et al. 2018; Custer et al. 2019; Gu & Qiu , 2019; Sun et al. 2019; Fang et al. 2021), it has a negative impact (Laruelle 2018; Kuo & Kommenda, 2018; Baristitz & Radzyner, 2018), risks and concerns associated with it, and certain mechanisms and policies needed in place for it to be effective for the local economy. Nonetheless, few research solely focuses its study empirically on assessing the effects of the BRI on employment in BRI participating countries and no research found analyzes the employment effects from the BRI in relation to the relative income level of participating countries.

Utilizing large scale infrastructure projects to accelerate economic development and employment growth is no new economic phenomena, as large scale infrastructure projects have existed in the past such as the 'New Deal' and the 'Marshall Plan' which the BRI is occasionally compared to in literature, have demonstrated previously. Though the BRI is more geographically and economically expansive than any previous infrastructure project, it will therefore play a much bigger role across countries' economies on a scale that has not been seen before, making this project unique in its study. Though as the research notes, this along with the ever-changing geographic expansion of the BRI makes quantifying and measuring the impacts of the initiative a major challenge, resulting in varying scopes of study and methods used for analysis by different researchers.

2.2 Positive Impact From BRI

Understandably, there is a lot of excitement and optimism surrounding the construction of the BRI since its unveiling in 2013, and many studies are keen to emphasize and prove the economic

benefits the initiative will bring to countries, particularly for those of the developing World. Established within literature and development reports, there is a consensus that the infrastructure investment coming from the BRI provides an "alternative way to boost economic development and provide employment" (Laruelle, 2018). Among the benefits the BRI brings identified within literature include; substantial improvements in "trade, foreign investment, and living conditions for citizens" within BRI countries (World Bank, 2019). The impact of the BRI from a macro and broader focus on economic development in studies like Sun et al. (2019), conclude that the global infrastructure program has "enabled participating countries to achieve above-average economic growth rates" and greatly improve their capabilities to do so by significantly improving the employment population ratio and industrialization processes. BRI projects in transport infrastructure alone have been estimated to help "lift 7.6 million people from extreme poverty and 32 million from moderate poverty" (World Bank, 2019). Such praise that is shared among scholars for the economic benefits the BRI brings helps to establish the BRI as a strategy for economic development in emerging economies and a potential solution to the World's infrastructure needs (Chandran, 2018).

According to Yue et al. (2018), the BRI has had a positive impact on employment within participating BRI countries since it promotes investment and consumption, which in turn stimulates the employment rates within BRI countries. Perhaps, the most applicable or akin study that has been conducted in relation to the focus of the study of this paper, Yue et al. (2018) is the only study to highlight the gap in research surrounding the impact of the BRI on employment in BRI countries and empirically focus on it. Although they don't incorporate income as a variable into their study, they account for heterogeneous effects the BRI may have on employment by including analysis for different gender and education groups within their study. Their results allow them to expand their analysis to the impact the BRI has on the internal structure of employment in BRI countries by placing a large emphasis on looking at the effect on employment among different levels of education within BRI countries. They find that the BRI has increased employment growth rates in participating BRI countries by 0.093%. Interestingly, they are also able to conclude that the BRI has a more significant effect on the employment growth rate of the male labour force and people classified among a higher education group, which is therefore having an effect on changes to the employment structure within BRI countries.

Outside of Yue et al. (2018), most research that has looked at the effect of the BRI on employment have used single case study or regional scopes of analysis. Most of these have been conducted in developing countries and regions usually in Africa (Gu & Qiu, 2019) or Central Asia (Laruelle, 2018; Arduino & Cainey, 2018; Custer et al. 2019; Mamirkulova et al. 2020). Contrary to popular reports that Chinese labour contracted from the BRI is harming local employment opportunities in some African nations, Gu & Qiu (2019), found that operating Chinese firms have increased the employment among local labourers in Africa since the start of the initiative. This was based on results from a survey conducted on eight BRI countries in Africa between 2016 and 2017 which concluded that Chinese firms did in fact make an effort into investing in African workers through apprenticeship programmes that had been established

to provide training for local workers to be employed, which can been seen as evidence of the effect of the soft infrastructure that has been implemented. Though for those Kazakhs that have studied in China as a result of agreements in education from the BRI, Custer et al. (2019) highlight that Chinese firms are providing them with lucrative employment opportunities to work back home. As a result of new and improved efforts by China after some initial backlash at the start of the initiative, Custer et al. (2019) find that corridor countries bordering China are now starting to think more positively about China due to the increased levels in bilateral trade between them that give new opportunities for employment growth. In other more niche and narrower focused studies in regard to the BRI, Mamirkulova et al. (2020) show that the BRI has developed new areas for employment from the installment of infrastructure that creates sustainable tourism opportunities in Kazakhstan. Mamirkulova et al. (2020), make the point that particularly for developing countries with emerging economies, tourism infrastructure positively affects citizens' quality of life because of its connection to establishing new businesses and employment opportunities that provide new sources of income as a result.

Interestingly, from the opposite perspective of employment, Chen & Chen (2020), analyze the effect the BRI has had on employment within China as a result of outward foreign direct investment (OFDI) that is being put into BRI countries. They find that the OFDI to BRI countries resulted in Chinese firms reducing their overall employment levels but increasing the employment of higher skilled workers and consequently increasing wage levels. Likewise, Liao et al. (2021) study this perspective on BRI employment, assessing the relationship between BRI OFDI and domestic employment within China. Though, their study finds that the OFDI of China positively impacts employment at home and that the BRI has significantly moderated this impact.

The observations of research suggests that the BRI can have a different impact based on the short vs long-term growth effects and sector specific employment gains as Fang et al. (2021) highlight. Focusing on sector specific employment effects, Fang et al. (2021), study the transport railways constructed by the BRI finding that while it could not be “systematically associated with short-term economic growth”, based on the identified effect that the new railways boosted local employment, it can therefore establish that there is a potential for future long term economic growth. In addition, their analysis aggregated that in terms of sector specific effects, that gains to the economy emerged predominantly within the service sector indicating that the transport infrastructure had a spillover effect into other economic sectors. Even so, the direct spillover effects into the local economy from the BRI investments may be limited because as Baristitz & Radzyner (2018) argue, “Chinese investors often employ their own workers and preferably rely on their own resources”. Meaning that in terms of direct employment in the short run, participating BRI countries may not benefit a great deal, however, in the long run the researchers concede that this effect will be different and participating BRI countries will benefit more from the stimulated economic growth.

2.3 Negative Impact & Risks Associated with BRI

While the BRI has received much praise throughout literature for the opportunities and potential it gives to employment, the positive impact of the BRI has not been shared everywhere among researchers when it comes to employment. Several critics have raised concerns about the BRI, that it relies on the contracting of a Chinese workforce, increases countries' debt levels, and serves China's interests first. Despite the newly created jobs, the most criticized aspect of the BRI is that "China's dominance in the construction sector comes at the expense of local [workers and] contractors" in participating BRI countries (Kuo & Kommenda, 2018). This is because as Custer et al. (2019) point out, most of the infrastructure projects that are constructed by the BRI are done by Chinese firms employing primarily Chinese labour. Identifying that China is "one of the biggest exporters of migrant workers in the World", experts are concerned that this practice does not help to address employment issues in BRI countries and regions with high unemployment levels (Laruelle, 2018). This has fuelled concerns that the influx of Chinese workers into BRI countries can create a negative public attitude towards Chinese infrastructure investment because of the assumption that the increase in foreign workers will increase competition in the local job market of BRI countries (ibid.). The concern is that this will deprive local workers and contractors of the employment opportunities that have been created as a result of the BRI.

The implementation of the BRI has not in all cases proved to be an effective program for helping to develop the employment of a country, as Laruelle (2018) points out in a case study of Kazakhstan and Kyrgyzstan, arguing that China has been unable to provide employment for all. Although they concede that the infrastructure projects provided by the BRI have provided employment opportunities, the BRI is facilitated by Chinese state owned enterprises which often means that in many cases project loans are contingent to a degree on adopting Chinese labourers and contractors for employment (Laruelle, 2018). A rise in Chinese economic influence in the Central Asia region is leading to an increase in the number of workers from China settling in and they claim that this does not help borrower countries in regions with already high levels of unemployment, which is often the case in Central Asian countries (ibid.). Though, concede that this may be based "more on perception than reality" (ibid.). Some scholars take the position that the BRI is established to serve China's geopolitical and economic interests first and is not the "mutually beneficial" development and "win-win cooperation" it portrays to be (Johnson, 2016). This is because as Laruelle (2018) highlights, the loans provided through the BRI are in effect helping to support Chinese firms, since a large number of the projects financed by China are conditioned on and being constructed by Chinese firms that primarily hire Chinese labour and use their equipment. Concerns like this with China's BRI practices adds to the perception that the BRI projects predominantly benefit China more than they benefit the actual host country, especially if it is a developing one (Johnson, 2016). However, Laruelle (2018) acknowledges the fact that the more skilled Chinese workers that are recruited helps to mediate developing regions' lack and need for highly qualified workers, since there is a gap in the labour force due to 'brain drain' as a result of an erosion to the education system.

Consequently, there is a mixed reaction among the international community in regard to the practices of the BRI. Despite all the investment from the infrastructure projects there is concern that there is a lack of local employment opportunities (Chandran, 2018). The other concern revolves around BRI related debt and that engaging in BRI investments adds to countries' fiscal risks. Economists that are critical of the initiative are concerned about the viability of BRI projects in regions of poor governance and political instability, particularly in developing and low income countries. Within participating countries, governments are required to contribute to the financing of the BRI's infrastructure investment either through direct borrowing (loans) or issuing debt guarantees from a central government agency or state-owned enterprise (World Bank, 2019). The World Bank (2019) underlines this potential risk by emphasizing that infrastructure is costly and that for many BRI countries, investment is happening in the context of rising public debt. Even though there are many potential economic gains to be made from infrastructure investment, they come with considerable risk. The tradeoffs that come with participating in the BRI must be considered carefully by those that are planning to join or have already signed deals. According to the World Bank (2019), nearly a quarter of BRI participating countries already have high levels of debt and their analysis shows that for some economies, "medium-term vulnerabilities could increase". In addition, in a 2018 report, the Center for Global Development found that a large handful of BRI countries were at significant risk of not being able to pay back their loans (Kuo & Kommenda, 2018). This risk of taking on BRI related debt was brought to public attention when Sri Lanka had to hand over and lease one of it's deep-water ports (Hambantota Port Development Project) to China for 99 years after struggling to repay back loans (Abi-Habib, 2018). Rather than easing repayment terms, China demanded seizure over equity in the port (ibid.) It has caused some countries such as Malaysia and Pakistan to reconsider costs of their projects and renegotiate BRI deals (Kuo & Kommenda, 2018). Within the initiative, "there are some extreme cases where China lends into very high risk environments" which among critics of the BRI has sparked accusations that China is engaging in debt-trap diplomacy (ibid.). Though as Dollar (2020) reminds us, most of the countries that are taking loans from China through the BRI are also borrowing from Western countries which makes it seem exaggerated that they are beholden to China in any way related to debt-trap diplomacy. All things considered, the BRI is characterized with both optimism and concern among those who see the BRI for the many benefits it brings for economic development and those that urge caution over potential risks to local employment and debt.

2.4 Mechanisms & Policies For BRI Employment Success

Research suggests that most of the issues identified by scholars that are critical of the initiative's practices or concerned with BRI employment may be solved or avoided altogether given that the right set of policies and production mechanisms are put in place by host countries. Within the literature, successful and positive improvement to employment within local economies from the initiative is said to be attributed to embracing local stakeholders, the institution of quotas, and

investment into human capital as well as the integration of logistics and local production networks. A report by the SIPRI concluded that while infrastructure development can provide employment and economic activity, tapping its full potential "also requires local states' investment in human and institutional capital" coupled with the right economic policies from local states (Zhou & Ghiasy, 2017). Among one of the policies some Central Asia states have introduced in order to combat excessive foreign employment and create jobs for local workers in Chinese owned firms are quotas for local workers that must be employed within projects (Laruelle, 2018). One of the attractions to China and its investment into non-EU member states is that they are able to bypass EU trade and employment laws (Baristitz & Radzyner, 2018). Though China is realizing that they must do more to improve the image of the BRI internationally, one way through which they can achieve this is by embracing more local stakeholders (Chandran, 2018). According to Laruelle (2018), in order for the local economies of BRI countries to truly benefit from BRI investment, employment opportunities need to be supplemented with "training, professional development, and corporate social responsibility activities". These extra services to employment will help to further counter concerns over China's BRI practices and improve the attitude among local workers competing for jobs in infrastructure. With the aim to capitalize on the promise of greater transport and economic connectivity, the sites for infrastructure projects that are being built in BRI participating countries, must be integrated into logistics and local production networks "that connect resource frontiers with centres of manufacturing" so that the infrastructure has a network economically that integrates with other sectors of the economy as a hub (Schindler et al., 2019). Infrastructure that is better connected with the greater economy allows for increased economic activity and therefore employment growth.

3 INFRASTRUCTURE DEVELOPMENT THEORY

3.1 Infrastructure Investment & its Relationship to Employment

Within the theoretical framework of studies that have reported on the impact of infrastructure on economic development is the well established assumption, based on aggregate data from the empirical research of development banks and economists, that infrastructure investment and employment are correlated. This is based on the premise that infrastructure development and employment creation have a relationship that is linked (Sawada, 2019). The relationship is a positive one as investment that goes into infrastructure creates new opportunities for income, which is what generates new jobs and therefore the growth in employment. A considerable number of studies have inarguably proven the significance of investment in infrastructure on positive economic growth (Germaschewski, 2016). In economic theory, the level of infrastructure is a reflection of the level of productivity an economy holds as a factor of production (Sun et al., 2019). This means that through the associated gains in productivity that

infrastructure provides, economies are able to develop at a rate that is dependent on their infrastructure quality. Possessing good infrastructure, and improvements to it, promotes economic development (ibid.). While a lack of or having backward infrastructure can hinder economic development (ibid.). Countries which hold better infrastructure are likely to experience more balanced growth in economic development since good infrastructure, particularly in transportation, allows for a wider redispersion of economic activity to other sectors (Li et al., 2020).

The phenomena surrounding the relationship between infrastructure and employment is based on both economic and social payoffs that reinforce one another to create greater factors of production possibility. For example, the investment into the construction and improvement of "basic infrastructure services, such as hospitals, schools, water supply and sanitation", raises a populations' standard of living (Estache et al., 2013). Subsequently, it increases a populations' overall employability and prospects for inclusive growth due to the improvements in health, education, quality of life, etc brought about by infrastructure services (ibid.). Another example; transportation networks, expand the reach for economic activity by better connecting people and businesses and allowing a population greater opportunity to engage in activities that require employment or simply to travel to work. By building the foundations for long-run economic growth, infrastructure effectuates income opportunities and generates jobs (ILO, 2021). Infrastructure projects create immediate short-term employment and sustain long-term employment. If directed effectively through investment, infrastructure has an extensive impact on both economic and social aspects of development which promotes opportunity for greater employment among populations.

3.2 Indirect vs Direct Employment & the Multiplier Effect

There are two ways in which infrastructure has an effect on employment, either directly or indirectly. The investment that is put into the construction of infrastructure boosts employment in sectors that supply the inputs and factors of production to projects directly or indirectly (Estache et al., 2013). In addition, employment is boosted in sectors that supply goods and services to those that are benefiting directly or indirectly from the infrastructure investment as a result of the extra demand that is created from the additional source of income those benefiting from infrastructure receive (ibid.). Short-term employment tends to be associated with direct employment as long-term employment is associated with indirect employment. Direct, short-term employment is employment that is created during the building phase of infrastructure through construction labour or other related service aspects of infrastructure provision (Fang et al., 2021). Though the construction process of infrastructure may also have indirect employment effects, as the use of local resources for construction will have backward and forward linkages from the labour and materials that are used to supply the project (ILO, 2021). Indirect, long-term employment is created from the assets that are built by infrastructure that increase access to income and employment opportunities (ibid.). To elaborate on this, a new development of

infrastructure may attract other businesses to an area of construction from the increase in economic activity or link different business sectors to one another from the increased connectivity brought, creating opportunity for long-term growth in employment in areas that probably would not have occurred without investment to infrastructure. Business agglomeration is just an example of the effect an increase in connectivity brought about by improvement in infrastructure would bring. In terms of skill, not all jobs created from infrastructure investment are equal. For example, infrastructure projects such as road and bridge construction, have a greater impact on direct employment in low-skilled labour (Estache et al., 2013). On the other hand, infrastructure projects in transport, communication, energy and information technologies will have larger indirect effects and therefore have an impact on a more diverse set of employment with different skills and jobs (ibid.).

The indirect effects to employment brought about by infrastructure investment can help be explained by the multiplier effect or job multiplier. As a concept of job creation, the multiplier effect measures "how the creation or destruction of output or employment in a particular industry translates into wider employment changes throughout the economy" (Bivens, 2019). This is based on the assumption that each sector and industry of the economy has both backward and forward linkages that ripple the effects of economic production and transaction and help to spread them across to the rest of the labour market (ibid.). The idea that production in one sector of the economy carries linkages to other sectors of the economy is in connection with the fact that production in one industry depends on the suppliers in another industry (backward linkage) while income that is earned through wages in the production and supplier sectors is transferred to other economic sectors through spending (forward linkage) (ibid.). Multipliers are typically used to estimate and measure the indirect and induced employment effects from infrastructure while direct labour is measured based on information about the amount of different types of labour that is required (Estache et al., 2013).

3.3 The Factor of Income

While investment in infrastructure can create employment in both short-term and long-term capacities, directly or indirectly, its services lay down important foundations for future economic growth. Though it should be acknowledged that across different countries hosting infrastructure investment, there are large differences in the initial economic and social conditions in terms of the potential for job creation, existing infrastructure gaps, and overall wealth of their economies. Therefore, the degree of impact an infrastructure project has may vary depending on the initial conditions of the country the infrastructure construction is taking place in. This is where the relative income level of a country can be a factor in determining this degree of impact from infrastructure investment, as a country's income group is a good indicator of the initial conditions within a country, as well as its economic complexity and future growth (Hidalgo & Hausmann, 2009). A country's level of income can be an indicator of the level of education a country holds, its employment opportunities, level of globalization and other socio-economic

conditions that can all influence how infrastructure performs and what type of effect it has on employment and for increasing it within the wider economy. For example, in more developed and higher-income countries, the initial impact of an additional unit of infrastructure is likely smaller, however, there are more indirect employment effects in higher-income countries that have the potential to create more employment gains as a result of greater sectoral linkages due to existing high quality infrastructure (Estache et al., 2013). Whereas in lower-income countries, the employment effects are largely reliant on direct employment, as there are less foundations in place from existing infrastructure gaps to support indirect employment and multiply the gains from an additional unit of infrastructure into other sectors of the economy. Low income countries tend to lack in infrastructure and poorly developed levels of infrastructure may mean that a country and its economic climate is not in a position to fully maximize on the benefits from the investment that is put into infrastructure (Stockmann, 2019).

When it comes to attracting foreign investment, the economies belonging to countries of high and upper-middle income groups attract the most (Chen & Lin, 2018). This is because as experts find, variables related to higher levels of human capital and better infrastructure quality favour a good climate for investing and for this reason play a crucial role (ibid.). While countries belonging to a high income group attract more foreign investestment, the conundrum is that the infrastructure financing needs in low income countries is much more substantial (Germaschewski, 2016). Governments of low income countries tend to be eager in wanting to attract foreign investment and build more infrastructure, given that infrastructure investment produces relatively high economic returns particularly when there is a need to provide a source of immediate jobs (ibid.). For developing and low income countries, infrastructure investment provides an immediate impact by creating jobs during the phase of economic transition towards development and putting in place the necessary utilities and services for long-run economic growth (Estache et al., 2013). The immediate benefits lie in the opportunities for locals to receive employment through the construction or supply industries of the infrastructure project (Wells & Hawkins, 2008). Thus it is expected that low income countries experience greater gains in short-run growth and short-term employment benefits than long-term growth when it comes to the impact of infrastructure investment. However, as things stand in the current foreign infrastructure investment climate, much of the funding of infrastructure in low income countries does not entirely benefit local workers due to a lack of and difficulty implementing procurement policies that increase local input into the delivery of infrastructure projects (ibid.).

3.4 Hypotheses

The countries lining the corridors of the BRI consist of a highly diverse set of economies and this can present a major challenge to providing analysis of the BRI's overall effects on employment. They vary in terms of their maturity, infrastructure potential and income levels with 7 low income countries, 22 lower-middle income countries, 21 upper-middle income countries and 20 high income countries (see Appendix B). The problem with the few existing literature covering

the BRI's impact on employment is that a participating country's level of income is not considered as a variable that interacts with the relation between infrastructure development and employment. By assessing the impact of the BRI on countries according to their respective income group (high, upper-middle, lower-middle and low), income acts as a control that holds variation in economic and social conditions constant within their groups. This may lead to different results when analyzing the effect the BRI has on employment, as it can be determined for which set of participating corridor countries the BRI is more beneficial and effective for as a development strategy that promotes growth in employment. Given the knowledge established from the theory presented in the previous chapter, the empirical analysis of this paper tests two hypotheses that are related to the effect of the BRI on employment in BRI participating corridor countries. The following is expected to be found from this research:

Hypothesis 1: *The BRI significantly promotes employment growth in BRI participating corridor countries.*

The first hypothesis tests solely the overall effect the BRI has on employment rates by examining the relationship between BRI participation and employment levels between the economies of BRI corridor countries and those of non-participating BRI countries. In this setting, BRI participation serves as the independent or explanatory variable and the employment rate is the dependent or response variable that is being observed. Due to the relatively short amount of time that has passed since the BRI was implemented, the long-term effects on employment are limited at this point and are not able to be assessed. This means that only the short-term effect can be empirically tested from the data and is a limitation of the research. Therefore, the effect will be estimated by the following degree: it significantly promotes rapid employment growth or it does not significantly promote rapid employment growth. It is expected that the BRI does increase employment in corridor countries as theory strongly suggests that infrastructure investment and employment are positively correlated.

Hypothesis 2: *The BRI has a greater effect on employment growth in countries of higher income.*

The second hypothesis is extended to examine the influence a country's level of income may have on the BRI's effect on employment growth. It is acknowledged that there are differences in the economic and social conditions among the BRI corridor countries that are hosting infrastructure investment. Income level can reflect these differences and therefore might affect how infrastructure is able to perform, which would influence the effect the BRI has on employment growth within a country according to their respective income group. This means that each of the four income groups will be assessed separately in order to determine the set of BRI participating corridor countries within which income group experience the most gains to employment. Therefore, it is logical that BRI participation among each of the four income

groups will be used and tested as four separate independent variables when measuring employment rates as the dependent variable.

An understanding of the theory gives the impression that countries of lower levels of income are not able to maximize gains in employment from infrastructure as much as high income countries and that higher income countries attract more infrastructure investment. That being said, the direct impact of infrastructure investment on employment is smaller in countries of higher income where indirect employment effects are greater compared to lower income countries where employment effects are reliant on direct employment. Considering that the theory expects lower income countries to experience greater gains in short-term employment growth, review of literature on the BRI suggests that the direct impact on employment is not so substantial due to a lack of efficient procurement policies and existing infrastructure gaps that hamper local input of labour. Therefore, it is expected that corridor countries of a higher income group will experience a greater effect on employment growth from the BRI as the foundations to support and multiply gains to employment are already in place.

4 RESEARCH METHODOLOGY

4.1 Research Design & Data Collection

To test the two hypotheses, a difference-in-differences (DID) estimation method is used to evaluate whether or not the BRI has promoted employment growth in participating BRI countries that lie along the corridor 'Belt Roads' of the BRI. The DID method is a popular tool within statistical research that is typically applied to evaluate the effect of a public intervention or treatment of interest on a relevant variable outcome, in this case to quantitatively estimate the effects of the BRI's implementation on employment rates. In DID estimation, the impact of an intervention or treatment of interest is measured by mirroring the differences in outcome between units of a treated group and a non-treated group, both before and after the implementation of the intervention (Yue et al., 2018). Logically, the employment rates of BRI participating countries is the treatment group and the employment rates of non-participating BRI countries is the control group. From here, this method then provides the empirical analysis with a mean value in order to derive the net effect of the BRI on employment rates across participating countries included within the research as a whole. In addition, DID estimation measuring employment rates will be repeated for each of the four country income groups (low income, lower-middle income, upper-middle income and high income). In total 8 groups and 4 sets of DID estimation in order to determine whether the BRI has a bigger effect on employment rates in higher, middle, or low income countries compared to the employment rate growth in countries of the same income groups for non-BRI countries.

In the interest of trying to establish a pattern and find trends between BRI participation and employment growth, the DID estimation uses panel data to quantitatively evaluate the

difference in employment rates before and after the implementation of the BRI. Panel data is important as it provides measurements on individual cross-sectional observations for the same set of subjects over the same set period of time. The panel data on employment rates is secondary data that was already collected by the International Labour Organization (ILO) and downloaded from the employment statistics found on their online database. Formally defined as the employment-to-population ratio, the data collected on employment rates indicates the number of people (age 15 and above) who are employed as a percentage of the total working population in a country (ILO, 2021). In this research the employment rates between the years 2007 and 2019 are selected for the period of analysis with the treatment of interest, the implementation of the BRI, becoming effective in 2013 allowing for six years of analysis of both pre and post treatment from the intervention. Taking inspiration from the geographical approaches used by the World Bank (2019) and OECD (2018) reports, the scope of this research focuses on the impact of the BRI on participating countries that are located along the corridor 'Belt Roads' of the BRI. The World Bank (2019) uses a list of 71 countries that are considered BRI corridor economies at the time of the report but have not all necessarily signed collaboration agreements with China. The OECD (2018) includes 72 economies whose countries are listed in China's 2015 Official Action Plan plus some economies that are heavily associated with the initiative at the time of the report. The two approaches reviewed led to slightly different lists. This study chooses to use only countries that strictly lie along the corridors of either one of the six overland 'belts' or the maritime 'road' of the BRI and who are currently engaging in the initiative. That is why instead of out of the total 140 countries that are claimed to be participating in the BRI, only 70 corridor BRI participating countries, excluding China, are included within the treatment group of the analysis (see Appendix A). Of the 195 countries globally, the remaining 55 countries that have no affiliation with BRI participation will be included in the control group (see Appendix C). To summarize, there are 70 participating BRI countries and 55 non-participating countries used for this research. Note that some countries from this list indicated by an * had to be excluded from the final analysis due to a lack of data.

4.2 Operationalization & Method of Analysis

Table 4.2 details a list of the variables that are used within the empirical analysis in the next chapter. As the independent variable of this analysis, BRI participation is utilized as a dummy variable, indicating a value of 1 if a country is BRI participating and 0 if not. The dependent variable, employment rates, is measured as a percentage by an employment-to-population ratio. This operationalization of variables applies the same throughout each of the four income group specific DID estimations.

Once collected, data was then analyzed using the statistical software; STATA, a recognized tool within the field of econometrics for analyzing statistical data. An important requirement of DID that allows for an unbiased estimation of the data which is used is the parallel trends assumption. This assumption requires that prior to the introduction of the

treatment effect, both the treatment and control group follow a parallel trend in terms of the dependent variable that is being measured. Meaning that in the absence of the BRI, the countries within both BRI participating and non-BRI participating groups are following the same growth trend in employment rates with a difference that is constant over time between the two groups before the BRI's introduction. That being said, this is not entirely realistic due to the heterogeneity among economic developments of the wide variety of different countries that are included. Therefore, to help satisfy the parallel trend assumption a couple of control variables are added to control for country variations in GDP growth and FDI which can influence overall employment trends. Data controlling for GDP growth and FDI is collected from the World Development Indicators online DataBank (World Bank Group, 2021).

Starting with the first hypothesis, first examined is the impact of the BRI on employment growth in participating BRI corridor countries as a whole. The following equation is run for DID estimation:

$$Employment\, y_{it} = \alpha + \beta BRI_i * Time_t + GDP_{it} + FDI_{it} + \lambda_t + \mu_i + \varepsilon_{it}$$

y is the output variable of employment and *i* and *t* represent country and year. BRI is the dummy variable which represents whether or not a country is participating as a corridor country in the BRI. $Time$ represents a dummy variable for time equal to 1 if ≥ 2013 and 0 if not. A couple of country and time varying controls, GDP and FDI, that may affect employment rate trends are added to the model. Note that GDP is controlled for using GDP growth as a percentage value and FDI is controlled for as a percentage of GDP. λ_t is the year fixed effect, μ_i is the country fixed effect and ε_{it} is the error term.

For the second hypothesis, income group is added to the equation to investigate the significance a country's level of income has on increasing employment that is associated with BRI participation. The following equation is used:

$$Employment\, y_{it} = \alpha + \beta BRI_i * Inc(1-4)_i * Time_t + GDP_{it} + FDI_{it} + \lambda_i + \mu_i + \varepsilon_{it}$$

Depending on the income group that is being estimated, the dummy variable Inc indicates whether or not a country is in the selected income treatment group where it takes a value of 1 or 0 if it is in the control group for the selected income group. To cover for all the four income groups, this is applied through a series of dummy variables where each income group is coded as a different treatment ranging from 1-4, with 1 being high income and 4 being low income, before the variable takes a value of 0 or 1 in the dummy to indicate whether it is in the treatment or control group. This is done to ensure that those countries that are in the treatment group for DID estimation of the selected income group level are only compared to countries of the same level of income in the control group.

Table 4.2

Variable	**Abbreviation**	**Explanation**
Employment Rates *[Dependent]*	$Employment\ y_{it}$	Variable that is being measured as an effect of BRI participation. It is measured using data on employment-to-population ratio that is given as a percentage. Data on employment rates is gathered from the ILO for the range of years between 2007 - 2019.
BRI Participation *[Independent]*	BRI	Dummy variable that takes the value of 1 if country *i* is a participating corridor country of the BRI program and if otherwise, takes the value 0. Information on BRI participation, see Appendix A, is taken from multiple sources, the World Bank (2019), OECD (2018) and GFDC (2021). Countries that are reported to be listed in the BRI's 2015 Official Action Plan plus economies that at the time of reporting were heavily involved with the initiative and as of now participating members.
Time	TimePost	Time dummy that takes the value of 1 if the year is ≥ 2013 and 0 if otherwise.
Income	For participation among each set of income group, the variable will be coded: $Inc1_i$ $Inc2_i$ $Inc3_i$ $Inc4_i$	Indicator of the income group of a country *i* and the income group which is being tested for. Dummy variable that takes the value of 1 if a country is in the selected income treatment group and 0 if otherwise. 1 indicates high income countries, 2 upper-middle income countries, 3 lower-middle income countries and 4 low income countries.

Treatment Group:	Participating corridor BRI countries
Control Group:	Non-participating BRI countries

4.3 Methodological Choice

Assessing the effect of the BRI's implementation on employment within participating countries is important for verifying whether the BRI is an effective program for stimulating economic development through its global and regional infrastructure investment. DID allows for estimation of a specific intervention to be compared to the changes in differences over time, post intervention, between outcome means in a population that is treated and a population that is not by measuring average treatment effect (Donald & Lang, 2007). Because DID estimation requires collection of panel data over time from both pre and post intervention time periods, it is able to reduce biases in the estimation of treatment effect post intervention that could be the result of trends or permanent differences between the two groups that are compared (Columbia University, 2019). Other methods would not be suitable for the objective of this research as they would need to allow for an intervention of treatment that is observational and cannot rely on randomization for experimentation as exchangeability between treatment and control groups is not assumed (ibid.).

This is the first assessment of the BRI on employment that incorporates income levels as a variable in its approach to estimating the BRI's effect. DID is a good method for assessing and comparing changes in an outcome over time between a group that is exposed to a variable of interest and one that is not (Angrist & Krueger, 1999). It is well-suited for estimating the effect of a sudden change or intervention to an economic environment such as the BRI. Exploration of the effect of the BRI has been carried out by other researchers such as Yue et al. (2018), Fang et al. (2021), Chen & Chen (2020), Sun et al. (2019) using the DID method to analyze the BRI's impact on employment or other economic outputs such as FDI, trade and GDP growth etc. Typically, DID estimation contains just two periods of pre and post treatment, yet this can be extended to include multiple years of analysis over time, pre and post treatment. While this research is aware that one of the preconditions for performing DID estimation is that both the treatment and control groups share a common trend in order to satisfy the parallel trend assumption, given the economic variation of countries used within the analysis, this assumption may not be fully met. The economic developments of countries around the World are disproportionate and not exactly alike, therefore as previously discussed, a number of control variables are included to help satisfy this assumption. Additionally, this variation is mediated within the research by grouping and performing each set of DID estimation with countries according to their respected income groups which will help to limit and account for differing degrees of economic trends. It is also important to remember that another limitation raised earlier is that this research will only be able to make an assessment on the short-term impact to employment. This study is an exploration of the effect of the BRI on employment and therefore keeping the limitations discussed in mind, it should be seen as an attempt to establish patterns and trends rather than certify causal effects.

5 EMPIRICAL RESULTS & ANALYSIS

5.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Employment	1456	57.142	11.59	30.2	87.8
BRI	1456	.616	.487	0	1
Income	1456	2.143	1.017	1	4
GDP	1456	3.519	4.081	-36.4	25.5
FDI	1456	4.281	7.091	-40.3	86.6
Inc1	1456	.348	.477	0	1
Inc2	1456	.268	.443	0	1
Inc3	1456	.277	.448	0	1
Inc4	1456	.107	.309	0	1
ID	1456	56.5	32.341	1	112
Year	1456	2013	3.743	2007	2019

5.2 Total Impact

Regression results for DID estimation on the BRI's impact on total employment in all participating countries as a whole are reported in table 5.2. Using the first regression equation, the analysis starts with a DID estimation of the BRI as a whole, comparing all participating countries with all non-participating countries. DID estimation is first done without consideration for controlling variables in column (1) of table 5.2 before introducing GDP growth and FDI as time varying controls to see what effect including these variables have on the results displayed in column (2) of table 5.2.

Table 5.2

	(1)	(2)
VARIABLES	Employment	Employment
BRI	-4.072*	-4.190**
	(2.218)	(2.055)
TimePost	-0.00266	-0.00681
	(0.161)	(0.162)
DID	0.851***	0.910***
	(0.206)	(0.206)
GDP		0.0630***
		(0.0148)
FDI		0.00148
		(0.00894)
Constant	59.37***	59.20***
	(1.741)	(1.614)
Observations	1,456	1,456

R-squared	0.0320	0.0446
	0.0236	0.0339
	0.0238	0.0342

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The first DID regression without controls reports a statistically significant increase in employment, suggesting that BRI participation among corridor countries increases employment by 0.851% relative to non-participating countries in the control group. In column (2), adding in controls for GDP growth and FDI makes a noticeable difference to the DID regression results as relative employment rates increase to 0.910%. Although both regressions show a positive relationship that is statistically significant, the DID coefficient increases as does the overall R-squared once the controls are added in (see Appendix D). Displaying a significant value and improving the fit of the model, GDP growth proves to be an important control that needs to be included within the DID model which may have an impact on employment rates, whereas FDI is not significant as a control. Given the evidence of a highly significant and positive trend in employment rates in both regressions, hypothesis 1 is supported by the DID results, suggesting that the BRI promotes employment growth in participating corridor countries.

5.3 Impact by Income Group

Next, using the second regression equation, the impact of the BRI on employment rates per income group is examined in table 5.3. Different from the previous regression table, countries are compared only with other countries of similar economic and development levels from their respective income group, bar participation in the BRI, which helps create some degree of fixed effects. Column (1) indicates DID results for high income group countries, column (2) upper-middle income, column (3) lower-middle income and (4) low income.

Table 5.3

	(1) H	(2) UM	(3) LM	(4) L
VARIABLES	Employment	Employment	Employment	Employment
BRI	-1.678	-9.924***	4.199	-10.06
	(2.437)	(3.610)	(4.102)	(9.816)
TimePost	-0.254	0.802**	1.194***	-2.302***
	(0.271)	(0.375)	(0.262)	(0.291)
DID	2.237***	1.107**	-1.470***	1.114***
	(0.373)	(0.451)	(0.311)	(0.403)
GDP	0.0720**	0.0940***	0.0584**	-0.0356*
	(0.0289)	(0.0293)	(0.0267)	(0.0214)
FDI	-0.00972	0.0763**	0.0197	0.0695

	(0.0111)	(0.0357)	(0.0188)	(0.0472)
Constant	58.91***	58.04***	53.42***	70.32***
	(1.746)	(3.023)	(3.457)	(6.944)
Observations	507	390	403	156
ID	39	30	31	12
R-squared	0.1284 0.0966 0.0274	0.1480 0.1906 0.1888	0.0794 0.0324 0.0329	0.3870 0.0838 0.0864

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

According to table 5.3, DID estimation results are positive and highly statistically significant at the 1% level in column (1), meaning that BRI participation among high income countries increases employment rates by 2.237% relative to the control group. Among upper-middle countries in column (2), the DID coefficient indicates an increase among employment rates by 1.107%, again, this result is statistically significant. Likewise, low income countries in column (4) show a 1.114% increase in employment rates to a level that is, once again, statistically significant. And lastly, contradicting the trend of results in the other income groups, the DID result in column (3) for lower-middle income countries shows a decrease to employment, though not by an extensive amount. The DID results from table 5.3 support hypothesis 2, given that the employment rates found in high income countries participating in the BRI increase the most significantly compared to employment increases made in the three other and lower income groups.

5.4 Analysis

To reiterate, the research goal of the study aimed to determine whether participation in the BRI program significantly increases employment among Belt and Road corridor countries and to what extent a country's level of income influences the growth in employment from the BRI. Looking at the impact the BRI has had on employment in participating corridor countries as a whole, the data indicates that a trend exists between BRI participation and increased employment rates. Based on this study's DID estimation results, the revealed increase to employment in both regressions provides evidence of this with highly statistically significant results at the 1% level. This means that it can be confidently concluded that across the participating corridor countries used as the sample of treatment for this research, employment increases in at least 99% of the cases relative to the control group of non-participating BRI countries by a mean of 0.851% and 0.910%, respectively. These results fall in line with the direction of results from previous research on the BRI in relation to employment, particularly that of Yue et al. (2018) whose study is most similar to the research goal of this part of the study. Their results found a significant increase to overall employment growth in BRI countries by 0.093%, albeit using a different sample set of countries for treatment as all participating countries at the time of their research

were included. The results also complement previous data reported by the ILO, as the organization similarly reported that participating BRI countries experienced a 0.43% increase to employment rates between 2013 and 2016.

On the whole, the results of table 5.2 match the expectations of hypothesis 1 and support the notion that the BRI significantly promotes rapid employment growth in participating corridor countries. Nonetheless, there are a number of possible reasons why the results of this paper report a higher increase in employment and did not match exactly with or closer to the results found in previous research. It is important to remember that the selection criteria and sample size of countries used in the treatment and control groups of this study is different and unique to that of Yue et al. (2018) and the ILO. One plausible explanation behind an elevated result might be ascribed to the large economic heterogeneity among the treatment group used consisting of all participating BRI corridor countries as a whole, comparing them to another highly heterogeneous group of non-BRI countries. In some circumstances this makes a case of comparing apples and oranges as comparing, for instance, the effects of the BRI in a participating developed country such as Italy, to the effects of not participating in the BRI in a much less developed country such as Malawi, is comparing things that are fundamentally different to each other. Another explanation may be that more economic controls are required to account for different levels of development between countries and further isolate gains to employment. The drawback with this is that it often requires having to exclude further countries from the analysis due to a lack of data, particularly among low income countries, which are important for the analysis provided later on once income group is included as part of the analysis. Finally, the years included within the regression are different and stretch over a greater period of time to a more recent date than any research conducted previously, which may have contributed to a higher result found in employment rates. Despite a slightly higher difference of increase in employment rates to the results, there is enough significant evidence from the DID results that point to a positive trend in employment rates and establishes a pattern between overall BRI participation and employment growth among corridor countries of the BRI. Theory from literature and World development organizations heavily emphasizes a correlation between infrastructure investment and employment. The results from this research examining the BRI as an infrastructure development program can uphold the theory in this case, although it does not establish causality, it provides evidence that supports the general direction of this correlation.

Whilst the bulk of former research has focused on the effect of the BRI in participating countries as a whole, looking at the results provided in table 5.3, this second aspect of the research results provides a new insight into the relationship between BRI participation and employment by introducing income level as a variable into the analysis. As expected, this gives a clearer picture of the results and a better understanding of where the BRI is having the greatest impact since DID estimation is no longer comparing countries of widely different economic and development characteristics to each other. Using income as a variable to separate analysis along these lines allows for countries that are fundamentally more similar in terms of economic and

development levels to be better compared to one another within their own income group, conflicting only in BRI participation.

In table 5.3, high income corridor countries participating in the BRI are shown to experience a significant increase in employment rates as a result of infrastructure investment from participating in the BRI. Likewise, results within the upper-middle and low income groups present a significant increase to employment rates, though to a lesser degree in their coefficient values. And in contradiction to the trend of results in the other income groups, employment rates in the lower-middle income group decreased. In keeping with the expectations of hypothesis 2, the BRI has had the greatest effect on employment growth in high income countries considering that DID estimation produced the greatest significant increase to employment rates in the high income group than among any of the lower three income groups. This result supports existing theory on infrastructure investment in high income countries and builds on existing evidence of increasing support for participation in the BRI among high income countries as a result. Fitting with the theory, high income countries are able to better maximize on gains to employment and create additional employment due to the amount of existing high quality infrastructure that is already in place when joining the BRI. In comparison, with upper-middle or lower-middle income groups, it is important to keep in mind that these are countries that are still developing and, on the contrary, do not necessarily have all the infrastructure in place to fully expand on employment gains and be in a position to reap the benefits from the BRI immediately. The empirical results show this as even though the effects of BRI participation on employment growth are positive in upper-middle and low income countries, the lack of sufficient infrastructure can limit the positive effects to be attained as their growth in employment rates are not as appreciable as high income countries after the introduction of the BRI. That being said, a unit of infrastructure will have a larger marginal effect in a lower income country in comparison to a high income country. However, this larger marginal effect has a limited impact in terms of employment as most of its impact is only able to affect direct employment due to a lack of economic connectivity from existing infrastructure gaps. Despite theory linking lower income countries with greater direct employment effects, it is through indirect employment effects in high income countries that greater employment is created, attributable to the high levels of existing infrastructure that support greater sectoral linkages and thus have a greater multiplier effect on employment in the wider economy comparatively.

Another reason why the three lower income groups did not produce a higher increase to employment in their results may be down to the fact that there is greater variability within the data on employment between countries, the lower the income group that is being assessed. These countries tend to be not as stable economically as higher income countries and therefore their data is more varying and irregular. On top of that, the sample sizes are different between the income groups and not exactly the same which may have influenced the difference in employment gains between the separate income groups. Nevertheless, these results based on income group should be taken into account when considering future research on any effects of the BRI, as the countries within the program constitute a wide range of economies and levels of

development, which will have varying degrees of impact from the BRI and not just on employment.

5.5 Limitations & Future Research

One of the main limitations of this study, due to the relatively short amount of time that has passed since the BRI came into effect, is that only the short-term effects on employment are able to be analyzed. With a limit to data in the long-term, this may limit the scope of the results if the long-term impacts of the BRI on employment want to be considered and compared to the BRI's effect in the short-term. The results may also be impacted by the number of controls that were able to be included in the DID regression to help isolate the gains to employment. The choice of using additional further economic controls was constrained by a lack of data particularly among low income countries, and would lead to the exclusion of further countries from the analysis. With regard to controlling variation in employment trends, GDP growth and FDI were adjudged to be the two most important controlling variables, as these variables exert a substantial economic influence on employment growth in addition to being the most sufficient in terms of available data for the countries used in the research. Another limitation to the approach of this study is that it only includes analysis of the effect of the BRI on corridor countries that are participating. This may impact the generalizability of the results to the impact the BRI has on employment in other participating BRI countries that are not geographically within one of the corridors of the BRI.

Although the BRI officially began in 2013, in reality, sign-up to and involvement in the initiative did not occur at the same exact point in time for every country. While the corridor countries of the BRI were among the first countries to sign up to the initiative when the BRI was first introduced and before it was expanded to other parts of the globe, a handful of these countries would have joined the BRI a year or two later. Future studies should attempt to take into account this difference in time and year of joining the BRI which gives some slight variation in the treatment effect over time between countries that are being used for treatment. A possible recommendation could be to include time specific treatment effects for individual countries or staggered adoption through DID with multiple treatment periods. Although, since this study is interested in only the corridor countries of the BRI, staggered adoption of treatment effects is left to future extensions of this topic where multiple treatment periods over time would be more important for the inclusion of other countries outside the BRI corridors into the treatment group. Further future studies, following the segregated analysis of this study, should also take into account the utilization of income groups as a means of assessing the BRI's economic impact and the varying degree this separation will have on results.

6 CONCLUSION

One of the most ambitious infrastructure projects of the century, China has invested heavily into the funding of the Belt and Road Initiative. Since its unveiling in 2013, the vision of the initiative has centered around a drive to promote trade and inter-regional connectivity in order to make business more accessible for China to trade with the World, and for the World to trade with China. The infrastructure built by the initiative not only helps in aiding the development of countries that line its corridors but it creates trading partners for China and brings forward global economic integration, deepening and establishing new business links throughout the economies taking part. Infrastructure forms the foundations for economic development and plays an important role within the development of the World economy. Within economic thinking, infrastructure investment is widely believed to create employment and harbours a positive correlation with it. However, there is a lack of academic work that has assessed the impact the initiative has had on employment growth so far within countries taking part in the global infrastructure program. In light of this and forming the motivation for research, this paper aimed to test theory of a correlation between infrastructure investment and employment growth and examine whether or not the BRI increased employment within participating corridor countries of the Belt and Road. Using a DID estimation method based on 2007-2019 cross-country panel data, this research assessed employment growth in relation to participation in the BRI. Specifically, the impact of the BRI on overall employment growth within BRI participating corridor countries as a whole was first tested, before this was categorized and assessed in terms of income group.

The results of this study find that the BRI significantly increases employment in participating countries by 0.910% relative to non-participating countries and that the initiative has the greatest impact on employment growth rates in high income countries at 2.237%. The findings from this study help support the BRI in terms of its ability to stimulate job creation. Although, given that the BRI places an emphasis on the development of infrastructure in predominantly developing countries, what is disconcerting is that the greatest gains to employment are not made in these countries lacking infrastructure, but in countries that already have high existing levels of infrastructure. Having said that, the investment of capital from China into developing countries' infrastructure will be necessary to help jump-start their growth and therefore to allow them to maximize on employment opportunities. While there is still some uncertainty and skepticism over the practices and ambition of the BRI, in the near future, the effects of the BRI will become more visible economically as the initiative progresses over greater time and becomes more globally established. The BRI's ability to successfully generate new employment opportunities throughout the countries it operates in will be vital for its continued international support, expansion and growth going forward, as it plays a growing role in the global economy and the future developing World.

REFERENCES:

Abi-Habib, M. (2018, September 22). How China Got Sri Lanka to Cough Up a Port. *The New York Times*. https://www.nytimes.com/2018/06/25/world/asia/china-sri-lanka-port.html

ADB. (2017). *Meeting Asia's Infrastructure Needs*. Asian Development Bank. https://doi.org/10.22617/FLS168388-2

Angrist, J. D., & Krueger, A. B. (1999). Empirical Strategies in Labor Economics. *Handbook of Labor Economics, 3*, 1277-1366.

Arduino, A. & Cainey, A. (2018). *Risk assessment and mitigation in Central Asia: implications for foreign direct investment and the Belt and Road Initiative*. European Bank for Reconstruction and Development.

Baristitz, S. and Radzyner, A. (2018). The New Silk Road: Implications for Europe. Oesterreichische Nationalbank. SUERF Policy Note, 25.

Bivens, J. (2019). *Updated Employment Multipliers for the U.S. Economy*. Economic Policy Institute Working Paper no. 268. https://www.epi.org/publication/updated-employment-multipliers-for-the-u-s-economy/

Cai, P. (2017). *UNDERSTANDING CHINA'S BELT AND ROAD INITIATIVE*. Lowy Institute. https://www.lowyinstitute.org/publications/understanding-belt-and-road-initiative

Chandran, N. (2018, September 14). China can make its Belt and Road project more successful if it taps locals, experts say. *CNBC*. https://www.cnbc.com/2018/09/14/china-must-do-more-to-tap-locals-in-belt-and-road-initiative-panel.html

Chen, B., & Chen, Y. (2020). THE IMPACT OF THE BELT AND ROAD INITIATIVE ON FIRMS' EMPLOYMENT STRUCTURE AND WAGE — EVIDENCE FROM CHINA'S PUBLIC LISTED FIRMS. *Singapore Economic Review*, *66*(4), 1055–18. https://doi.org/10.1142/S0217590820490028

Chen, M. X., & Lin, C. (2018). *Foreign Investment across the Belt and Road : Patterns, Determinants, and Effects*. World Bank Development Research Group. Policy Research Working Paper No. *8607*.

Columbia University. (2019). *Difference-in-Difference Estimation*. Columbia Public Health. https://www.publichealth.columbia.edu/research/population-health-methods/difference-difference-estimation

Custer, S., Sethi, T., Solis, J., Lin, J., Ghose, S., Gupta, A., Knight, R., and A. Baehr. (2019). *Silk Road Diplomacy: Deconstructing Beijing's toolkit to influence South and Central Asia*. AidData at William & Mary.

Dollar, D. (2020, October 1). *Seven years into China's Belt and Road*. Brookings. https://www.brookings.edu/blog/order-from-chaos/2020/10/01/seven-years-into-chinas-belt-and-road/

Donald, S. G., and K. Lang. (2007). Inference with Difference-in-Differences and Other Panel Data. *The Review of Economics and Statistics 89*, 221233. https://doi.org/10.1162/rest.89.2.221

Estache, A., Ianchovichina, E., Bacon, R., & Salamon, I. (2013). Infrastructure and Employment Creation in the Middle East and North Africa. Washington, DC: World Bank. Published. https://doi.org/10.1596/978-0-8213-9665-0

European Bank for Reconstruction and Development. (2020). *Belt and Road Initiative (BRI)*. https://www.ebrd.com/what-we-do/belt-and-road/overview.html

Fang, L., Kleimann, M., Li, Y., & Schmerer, H. J. (2021). The implications of the New Silk Road Railways on local development. *Journal of Asian Economics*, *75*, 101326. https://doi.org/10.1016/j.asieco.2021.101326

Germaschewski, Y. (2016). Getting help from abroad: The macroeconomics of foreign direct investment in infrastructure in low‐income countries. *Canadian Journal of Economics/Revue Canadienne d'économique*, *49*(4), 1502–1535. https://doi.org/10.1111/caje.12242

Gu, J., & Qiu, S. (2019). The Belt and Road Initiative and Africa's Sustainable Development: A Case Study of Kenya. *IDS Bulletin*, *50*(4). https://doi.org/10.19088/1968-2019.140

Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences*, *106*(26), 10570–10575. https://doi.org/10.1073/pnas.0900943106

Hillman, J. (2018). *China's Belt and Road Is Full Of Holes*. Center for Strategic & International Studies. https://www.csis.org/analysis/chinas-belt-and-road-full-holes

International Labour Organization (ILO). (2007–2019). *Employment statistics* [Dataset]. ILO Department of Statistics. https://ilostat.ilo.org/topics/employment/

International Labour Organization (ILO). (2021). *Infrastructure, Poverty Reduction and Jobs*. https://www.ilo.org/global/docs/WCMS_099513/lang--en/index.htm

Johnson, C. (2016). *President Xi Jinping's 'Belt and Road' Initiative: A Practical Assessment of the Chinese Communist Party's Roadmap for China's Global Resurgence*. CSIS Report. Center for Strategic & International Studies https://www.csis.org/analysis/president-xi-jinping%E2%80%99s-belt-and-road-initiative

Kanak, D. (2016, December 28). *China's Belt and Road Initiative vital to Asian job creation*. NIKKEI Asia. https://asia.nikkei.com/Economy/China-s-Belt-and-Road-initiative-vital-to-Asian-job-creation

Kuo, L., & Kommenda, N. (2018). What is China's Belt and Road Initiative? *The Guardian*. https://www.theguardian.com/cities/ng-interactive/2018/jul/30/what-china-belt-road-initiative-silk-road-explainer

Laruelle, M. (2018). China's Belt and Road Initiative and its Impact in Central Asia. Central Asia Program: The George Washington University. https://centralasiaprogram.org/wp-content/uploads/2017/12/OBOR_Book_.pdf

Li, J. H., Rim, G. N., & An, C. J. (2020). Relationship between Transport Infrastructure and Employment. *Business Perspective Review*, *2*(1), 13–28. https://doi.org/10.38157/business-perspective-review.v2i1.103

Liao, H., Yang, L., Dai, S., & Van Assche, A. (2021). Outward FDI, industrial structure upgrading and domestic employment: empirical evidence from the Chinese economy and the belt and road initiative. *Journal of Asian Economics*, *74*, 101303. https://doi.org/10.1016/j.asieco.2021.101303

Mamirkulova, G., Mi, J., Abbas, J., Mahmood, S., Mubeen, R., & Ziapour, A. (2020). New Silk Road infrastructure opportunities in developing tourism environment for residents better quality of life. *Global Ecology and Conservation*, *24*, e01194. https://doi.org/10.1016/j.gecco.2020.e01194

Nedopil, C. (2021). GFDC *Countries of the Belt and Road Initiative*. Shanghai, Green Finance & Development Center (GFDC). FISF Fudan University. https://greenfdc.org/countries-of-the-belt-and-road-initiative-bri/

OECD. (2018). The Belt and Road Initiative in the global trade, investment and finance landscape. In *OECD Business and Finance Outlook 2018*, Ch. 2. OECD Publishing. https://doi.org/10.1787/bus_fin_out-2018-6-en.

Rolland, N. (2019). *A Concise Guide to the Belt and Road Initiative*. National Bureau of Asian Research (NBR). https://www.nbr.org/publication/a-guide-to-the-belt-and-road-initiative/

Sawada, Y. (2019). Infrastructure investments, technologies and jobs in Asia. *International Journal of Training Research*, 17(1), 12-25. DOI: 10.1080/14480220.2019.1629724

Schindler, S., Liu, Z., & Liu, W. (2020). Demystifying Chinese overseas investment in infrastructure: Port development, the Belt and Road Initiative and regional development. *Journal of Transport Geography*, *87*, 102812. https://doi.org/10.1016/j.jtrangeo.2020.102812

Silk Road Briefing. (2019, October 21). *A Comparison Between Countries & Territories Not In China's Belt And Road Initiative With Those Who Are*. https://www.silkroadbriefing.com/news/2019/10/18/comparison-countries-territories-not-chinas-belt-road-initiative/

Stockmann, A.-S. (2019). *The Effects of Chinese FDI and Infrastructure on Economic Growth across the Belt and Road*. Uppsala universitet, Nationalekonomiska institutionen.

Sun, Q., Zhang, X., Xu, X., Yang, Q., & Wang, S. (2019). Does the "Belt and Road Initiative" Promote the Economic Growth of Participating Countries? *Sustainability*, *11*(19), 5240. https://doi.org/10.3390/su11195240

Vadlamannati, K., Li, Y., Brazys, S., & Dukalskis, A. (2019). *Building Bridges or Breaking Bonds? The Belt and Road Initiative and Foreign Aid Competition*. AidData Working Paper 72. AidData at William & Mary.

Wells, J., & Hawkins, J. (2008). Increasing local content in the procurement of infrastructure projects in low income countries. *Institution of Civil Engineers*, 6-7.

World Bank. (2019). *Belt and Road Economics: Opportunities and Risks of Transport Corridors*. DOI: 10.1596/978-1-4648-1392-4

World Bank. (2020). *WDI - The World by Income and Region* [Dataset]. https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html

World Bank Group. (2007–2019). *World Development Indicators | DataBank* [Dataset]. https://databank.worldbank.org/source/world-development-indicators#advancedDownloadOptions

Yue, L., Yingqi, J., & Xinquan, T. (2018). The Effect of the "Belt and Road Initiative" on Countries' Employment. In *The Belt and Road Initiative* (168–182). https://doi.org/10.1163/9789004373792_008

Zhou, J., & Ghiasy, R. (2017, April 4). *The Silk Road Economic Belt: How does it interact with Eurasian security dynamics? | SIPRI*. STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. https://www.sipri.org/commentary/topical-backgrounder/2017/silk-road-economic-belt

Appendix A - BRI corridor countries covered by this study

	Country	Economic Corridor		Country	Economic Corridor
1	Albania	China-Central West Asia	36	Mongolia	China-Mongolia-Russia
2	Armenia	China-Central West Asia	37	Russia	China-Mongolia-Russia
3	Azerbaijan	China-Central West Asia	38	Brunei	China-Indochina Peninsula
4	Bosnia & Herzegovina	China-Central West Asia	39	Cambodia	China-Indochina Peninsula
5	Bulgaria	China-Central West Asia	40	Laos	China-Indochina Peninsula
6	Croatia	China-Central West Asia	41	Malaysia	China-Indochina Peninsula
7	Georgia	China-Central West Asia	42	Philippines	China-Indochina Peninsula
8	Iran	China-Central West Asia	43	Singapore	China-Indochina Peninsula
9	Iraq	China-Central West Asia	44	Thailand	China-Indochina Peninsula
10	Israel	China-Central West Asia	45	Timor-Leste	China-Indochina Peninsula
11	Jordan	China-Central West Asia	46	Vietnam	China-Indochina Peninsula
12	Kyrgstan	China-Central West Asia	47	Afghanistan	China-Pakistan
13	Lebanon	China-Central West Asia	48	Bahrain	China-Pakistan
14	Moldova	China-Central West Asia	49	Kuwait	China-Pakistan
15	Montenegro	China-Central West Asia	50	Oman	China-Pakistan
16	North Macedonia	China-Central West Asia	51	Pakistan	China-Pakistan
17	Palestinian territory	China-Central West Asia	52	Qatar	China-Pakistan
18	Romania	China-Central West Asia	53	Saudi Arabia	China-Pakistan
19	Serbia	China-Central West Asia	54	United Arab Emirates	China-Pakistan
20	Syria*	China-Central West Asia	55	Yemen	China-Pakistan
21	Tajikstan	China-Central West Asia	56	Bangladesh	China-Myanmar
22	Turkey	China-Central West Asia	57	Bhutan	China-Myanmar
23	Turkmenistan	China-Central West Asia	58	Myanmar	China-Myanmar
24	Uzbekistan	China-Central West Asia	59	Nepal	China-Myanmar
25	Czech Republic	New Eurasian Land Bridge	60	Sri Lanka	China-Myanmar
26	Hungary	New Eurasian Land Bridge	61	Djibouti	21st Century Maritime
27	Slovakia	New Eurasian Land Bridge	62	Egypt	21st Century Maritime
28	Slovenia	New Eurasian Land Bridge	63	Ethiopia	21st Century Maritime
29	Poland	New Eurasian Land Bridge	64	Greece	21st Century Maritime
30	Kazakhstan	New Eurasian Land Bridge	65	Indonesia	21st Century Maritime
31	Ukraine	New Eurasian Land Bridge	66	Italy	21st Century Maritime
32	Belarus	China-Mongolia-Russia	67	Kenya	21st Century Maritime
33	Estonia	China-Mongolia-Russia	68	Maldives	21st Century Maritime
34	Latvia	China-Mongolia-Russia	69	Morocco	21st Century Maritime
35	Lithuania	China-Mongolia-Russia	70	Tanzania	21st Century Maritime

Sources: OECD (2018), World Bank (2019) and GFDC (2021).
Note: * Excluded from final analysis

Appendix B - Income group of BRI corridor countries covered by this study

High Income	Upper-Middle Income	Lower-Middle Income	Low Income
Bahrain	Albania	Bangladesh	Afghanistan
Brunei	Armenia	Bhutan	Ethiopia
Croatia	Azerbaijan	Cambodia	Nepal
Czech Republic	Belarus	Djibouti	Syria*
Estonia	Boznia & Herzegovina	East Timor	Tajikstan
Greece	Bulgaria	Egypt	Tanzania
Hungary	Iran	Georgia	Yemen
Italy	Iraq	Indonesia	
Israel	Jordan	Kenya	
Kuwait	Kazakhstan	Kyrgystan	
Latvia	Lebanon	Laos	
Lithuania	Malaysia	Moldova	
Oman	Maldives	Morocco	
Poland	Montenegro	Mongolia	
Qatar	North Macedonia	Myanmar	
Saudi Arabia	Romania	Pakistan	
Singapore	Russia	Palestinian territory	
Slovakia	Serbia	Philippines	
Slovenia	Thailand	Sri Lanka	
UAE	Turkey	Ukraine	
	Turkmenistan	Uzbekistan	
		Vietnam	

Source: World Bank (2020)
Note: * Excluded from final analysis

Appendix C - Non-BRI participating countries covered by this study

High Income	Upper-Middle Income	Lower-Middle Income	Low Income
Andorra*	Argentina	Belize	Burkina Faso
Australia	Colombia	Benin	Central African Republic
Austria	Dominica	Comoros	Congo, Dem. Rep
Bahamas	Guatemala	Eswatini	Eritrea*
Belgium	Marshall Islands*	Haiti	Guinea-Bissau
Canada	Mauritius	Honduras	Korea, Dem. Rep*
Denmark	Mexico	India	Malawi
Finland	Paraguay	Nicaragua	Niger
France	St. Lucia		
Germany	Tuvalu*		
Greenland*			
Iceland			
Ireland			
Japan			
Lichtenstein*			
Nauru*			
Netherlands			
Norway			
San Marino*			
Spain			
Sweden			
Switzerland			
United Kingdom			
United States			

Sources: World Bank (2020), GFDC (2021)
Note: * Excluded from final analysis

Appendix D - DID Regression Output Tables

*DID Regression without Controls

```
. xtreg Employment BRI TimePost DID

Random-effects GLS regression                   Number of obs     =      1,456
Group variable: ID                              Number of groups  =        112

R-squared:                                      Obs per group:
     Within  = 0.0320                                         min =         13
     Between = 0.0236                                         avg =       13.0
     Overall = 0.0238                                         max =         13

                                                Wald chi2(3)      =      46.98
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

Employment	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
BRI	-4.071941	2.218183	-1.84	0.066	-8.419501	.275618
TimePost	-.0026578	.1614952	-0.02	0.987	-.3191825	.3138669
DID	.8514156	.205752	4.14	0.000	.4481491	1.254682
_cons	59.36977	1.741057	34.10	0.000	55.95736	62.78218
sigma_u	11.390396					
sigma_e	1.9034731					
rho	.97283224	(fraction of variance due to u_i)				

*DID Regression with Controls

```
. xtreg Employment BRI TimePost DID GDP FDI

Random-effects GLS regression                   Number of obs     =      1,456
Group variable: ID                              Number of groups  =        112

R-squared:                                      Obs per group:
     Within  = 0.0446                                         min =         13
     Between = 0.0339                                         avg =       13.0
     Overall = 0.0342                                         max =         13

                                                Wald chi2(5)      =      66.05
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

Employment	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
BRI	-4.190195	2.0552	-2.04	0.041	-8.218313	-.1620766
TimePost	-.0068087	.1624836	-0.04	0.967	-.3252707	.3116533
DID	.9096625	.2063501	4.41	0.000	.5052237	1.314101
GDP	.0629845	.0148336	4.25	0.000	.0339112	.0920578
FDI	.0014796	.0089361	0.17	0.868	-.0160349	.0189941
_cons	59.19756	1.61393	36.68	0.000	56.03431	62.3608
sigma_u	10.481326					
sigma_e	1.8924484					
rho	.96842934	(fraction of variance due to u_i)				

*DID Regression High Income Group

```
. xtreg Employment BRI TimePost DID GDP FDI if Inc1 == 1

Random-effects GLS regression                   Number of obs     =        507
Group variable: ID                              Number of groups  =         39

R-squared:                                      Obs per group:
     Within  = 0.1284                                         min =         13
     Between = 0.0966                                         avg =       13.0
     Overall = 0.0274                                         max =         13

                                                Wald chi2(5)      =      66.63
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

Employment	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
BRI	-1.677655	2.436621	-0.69	0.491	-6.453345	3.098034
TimePost	-.254132	.2707624	-0.94	0.348	-.7848166	.2765526
DID	2.237031	.3725093	6.01	0.000	1.506926	2.967136
GDP	.0719544	.0289225	2.49	0.013	.0152674	.1286414
FDI	-.0097178	.0110757	-0.88	0.380	-.0314257	.0119901
_cons	58.91089	1.746031	33.74	0.000	55.48873	62.33305
sigma_u	7.4137265					
sigma_e	2.0321594					
rho	.93011574	(fraction of variance due to u_i)				

*DID Regression Upper-Middle Income Group

```
. xtreg Employment BRI TimePost DID GDP FDI if Inc2 == 1

Random-effects GLS regression                   Number of obs     =        390
Group variable: ID                              Number of groups  =         30

R-squared:                                      Obs per group:
     Within  = 0.1480                                         min =         13
     Between = 0.1906                                         avg =       13.0
     Overall = 0.1888                                         max =         13

                                                Wald chi2(5)      =      68.45
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

Employment	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
BRI	-9.924161	3.60962	-2.75	0.006	-16.99889	-2.849435
TimePost	.801805	.3750573	2.14	0.033	.0667061	1.536904
DID	1.107379	.4514326	2.45	0.014	.222587	1.99217
GDP	.0940101	.0293024	3.21	0.001	.0365785	.1514417
FDI	.0762753	.0356903	2.14	0.033	.0063236	.1462271
_cons	58.03641	3.02287	19.20	0.000	52.1117	63.96113
sigma_u	9.0124545					
sigma_e	2.0103912					
rho	.95259925	(fraction of variance due to u_i)				

*DID Regression Lower-Middle Income Group

```
. xtreg Employment BRI TimePost DID GDP FDI if Inc3 == 1

Random-effects GLS regression                   Number of obs     =         403
Group variable: ID                              Number of groups  =          31

R-squared:                                      Obs per group:
     Within  = 0.0794                                         min =          13
     Between = 0.0324                                         avg =        13.0
     Overall = 0.0329                                         max =          13

                                                Wald chi2(5)      =       32.21
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =      0.0000
```

Employment	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
BRI	4.198968	4.102163	1.02	0.306	-3.841124	12.23906
TimePost	1.19412	.262358	4.55	0.000	.6799076	1.708332
DID	-1.46953	.3114588	-4.72	0.000	-2.079978	-.8590817
GDP	.0583529	.0267372	2.18	0.029	.0059489	.1107569
FDI	.0197025	.0188388	1.05	0.296	-.017221	.0566259
_cons	53.42009	3.456868	15.45	0.000	46.64475	60.19542
sigma_u	10.234695					
sigma_e	1.3965514					
rho	.98172101	(fraction of variance due to u_i)				

*DID Regression Low Income Group

```
. xtreg Employment BRI TimePost DID GDP FDI if Inc4 == 1

Random-effects GLS regression                   Number of obs     =         156
Group variable: ID                              Number of groups  =          12

R-squared:                                      Obs per group:
     Within  = 0.3870                                         min =          13
     Between = 0.0838                                         avg =        13.0
     Overall = 0.0864                                         max =          13

                                                Wald chi2(5)      =       89.26
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =      0.0000
```

Employment	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
BRI	-10.062	9.815639	-1.03	0.305	-29.3003	9.176299
TimePost	-2.302081	.2909291	-7.91	0.000	-2.872291	-1.73187
DID	1.113797	.4033946	2.76	0.006	.3231582	1.904436
GDP	-.0356046	.021352	-1.67	0.095	-.0774538	.0062446
FDI	.0694563	.0471798	1.47	0.141	-.0230144	.161927
_cons	70.32245	6.94363	10.13	0.000	56.71318	83.93171
sigma_u	16.989899					
sigma_e	1.2485531					
rho	.99462853	(fraction of variance due to u_i)				