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THE PUSH AND PULL FACTORS OF CHINA'S OUTWARD FOREIGN DIRECT INVESTMENT IN BRI COUNTRIES

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Abstract. The purpose of this study is to examine the role of push and pull factors that have influenced China's outward foreign direct investment (COFDI) in the Belt and Road Initiative (BRI) countries. The sample of BRI countries is divided according to three geographical regions representing Europe, MENA, and Asia for better understanding of the main factors that influence the COFDI across the respective regions. This study supports Dunning's FDI theory in modeling the determinants of COFDI in BRI economies by focusing on the role of push and pull factors. This present study also extends and improves the existing research by considering the new factors, new methodology, and splitting the sample BRI economies. Thus, a static, dynamic panel and quantile regression technique was employed to model COFDI determinants for 50 BRI countries from 2005 to 2016. The main findings revealed that China's minimum wage policy, including the host countries' natural resources, labor cost, and institutional factors were the key determinants influencing COFDI. However, some determinants such as the host countries' gross domestic product, total patents, trade openness, and inflation rate did not significantly influence COFDI. By splitting the sample according to the respective regions, the results revealed that only the minimum wage policy significantly influenced COFDI in the European region. In comparison, natural resources, gross domestic product, and minimum wage policy were statistically significant for the MENA region. In the Asian region, minimum wage policy, government index, and trade openness were proven essential for COFDI. The policy implications from this study suggest that MNCs from China need to strategize their location for investment in BRI economies. In complement, the BRI recipient countries need to show their advantage and strength in attracting more FDI from China. BRI economies and China MNCs can also be leveraged through understanding how strong the push and pull factors are exerting on outward investment from China.

Keywords: China, outward foreign direct investment, pull factors, push factor, belt and road initiatives.

JEL Classification: F21, F23.

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Introduction

In 2001, China adopted a "Going Out Strategy" or "*zouchuqu*" policy that encouraged domestic Chinese firms to participate in cross-border investments to forge the strong growth of China's economy (Liu et al., 2017). In 2016, China accounted for 14.7 percent of the total global GDP, after the United States, which was credited with almost 25 percent. Due to the rapid development of her domestic economy, COFDI has increased significantly to reach a record US$196.15 billion, representing 13.53 percent of the global FDI outflows (UNCTAD, OECD). China is thus the world's second-largest recipient of FDI as well as the world's second-largest source of FDI (United Nations Conference on Trade and Development [UNCTAD], 2018). The rapid increase of China's OFDI is thought to be due to the Chinese government's new strategy known as the Belt and Road Initiatives (BRI). The BRI has opened up a new field of international relations featuring win-win cooperation. It provides a closer relationship between China and the participating countries, producing tangible welfare to all, and simultaneously promoting sustainable growth for the global economy. The BRI initiative also improves the business structure, specifically those businesses with overcapacity in China, notably the infrastructure and construction sector (Yu et al., 2019).

Before 2013, BRI-related countries were not the primary destinations for COFDI, and China only contributed an average of 10.8% of the total COFDI for this region (Liu et al., 2017). However, after establishing this BRI initiative in 2013, participating countries received massive investment in construction projects since these countries had become popular destination for Chinese Multinational Corporations (MNC). In 2015, investment projects were mainly focused on infrastructure facilities such as railways, airstrips, power grids, water preservation, and port construction, which accounted for 70 percent of the total COFDI (Kang et al., 2018). The full contracts between the Chinese and BRI-participating countries were extended to US$ 92.6 billion for new foreign construction projects, accounting for 44 percent of the total amount of newly approved construction projects abroad (Liu et al., 2017).

As a significant global economy player, China bears different characteristics on its motivation and risk attitude towards outward investment. Comparing the different theoretical motivations of outward FDI activity, such as market seeking, resource seeking, strategic asset seeking, and efficiency-seeking, China has typically been considered relatively more resource-seeking than other countries (Kolstad & Wiig, 2012). Besides, China has a large population that could contribute to the degradation of natural resources. For instance, China's population has grown from 1.36 billion in 2013 to 1.43 billion in 2019, thus recording an impressive growth (World Population Review, 2019) that is expected to continue for a decade. Even though China is prosperous with natural endowment, per capita income is gradually decreasing due to progressively higher demand. Hence, China has typically been relatively more resource-seeking than other countries (Buckley et al., 2007; Cheung & Qian, 2009; Chang, 2014). At the same time, it is widely believed that Chinese investors have shifted their interest to efficiency-seeking as their investment decision since the minimum wage trends have been drastically increased. Many researchers have indicated that China had enjoyed a long period of low labor costs in the past and thus would not require efficiency-seeking FDI motivation as a driver for COFDI (Kolstad & Wiig, 2012).

Thus, given this background, the main objective of this study is to empirically model the determinants of COFDI in BRI economies by focusing on the role of push and pull factors. In general, pull factors are the unique characteristics of the host country that attract FDI towards them. In contrast, push factors are the characteristics of the home country that push outward FDI into the destination economies. This FDI model is crucial for the China MNCs and recipient BRI countries to further understand how the push and pull factors have been reflected in China's outward investment decision. For further analysis, this study also examines whether push and pull factors differ across BRI regions, namely Europe, MENA, and Asia. This is pivotal for both parties whether China MNC and BRI recipient countries take leverage through a deeper understanding of the main factors that reflect the China's outward investment across regions.

This study's motivations to examine the role of push and pull factors of COFDI in BRI countries can be explained by two crucial reasons. First, given China's significant role as a foreign investor, the evaluation of critical factors that influence China's direct investment, particularly in BRI economies, is essential for further understanding how push and pull factors reflect China's outward investment. In China, push factors such as labour wages have drastically increased and caused anxiety in international advisory and business communities, affecting production costs. Besides, China has been warned that it may lose its exports in manufacturing products (Tao et al., 2010). In order to offset this issue, there are two main concerns considered by the Chinese government. First, should China investors use alternative ways to invest in other countries due to increased minimum wage? Second, should China investor shift their interest from market-seeking or political situation to efficiency-seeking? On the other hand, outward investment also depends on pull factors from the home country associated with market-seeking, asset-seeking, resource-seeking, and efficiency-seeking objectives (Buckley et al., 2007; Liu et al., 2017).

Second, for the pull factors, market-seeking MNC companies invest in the host countries to meet their demand for goods, the market size, market growth, and wage levels. Companies with resource-seeking are intended to use the natural resources, and agricultural production in the host countries invested. Resource-seeking is mainly raw materials from natural resources, low-cost labour, skilled labour, technology assets, and the host countries' infrastructure. Moreover, the efficiency-seeking investment aims to reduce or minimize production costs to achieve the overall cost-efficient of the MNC. Lastly, strategic asset seeking is the faster growing FDI compared to another three motivations of FDI. This strategy motivates firms to access host countries' knowledge, capabilities, technology, and innovations, which are the essential factors for which firms bring FDI into a specific country.

Owing to China's essential role in BRI, this paper may thus contribute into two dimensions. First, this study is beneficial to policymakers, regardless of BRI economies (host countries) or China as the investor country. For the host countries, BRI economies can leverage on the attractiveness of their pull factors that will draw in the China MNCs. By understanding these pull factors, they can implement extensive policy reforms to reduce investor risk, liberalize market access conditions, and create a more stable legal environment or friendly policy to attract foreign investors accurately, particularly from China. From the China perspective, China's development model seems to have reached a bottleneck. Its growth has continued to slow down in the past five years, prompting China to find new economic opportunities through the BRI (Huang, 2016). The MNC's can undoubtedly make optimal investment decisions by aligning the industry characteristic to mitigate the congestion issues and find new opportunities to grow in the new market to sustain the business environment.

For the second dimension, this study extends the literature of efficiency-seeking motivation of FDI by focusing on minimum wage in China. Numerous discussions underlie the impact of minimum wages on economic effects and mostly in advanced countries (the U.S.), focusing on influences on employment (Card & Krueger, 1994; Neumark & Wascher, 2000; Dube et al., 2010; Autor et al., 2016). China has consistently been recognized as one of the cheapest workforce countries due to the enormous population or labour abundance. However, the reversing trend is expected to have an impact on domestic producers. In addition, this present study also improved the existing research by considering the determinants of COFDI across three BRI sub-regions (Europe, MENA, and Asia) for further understanding on how the main factors affecting MNCs' relocation from China have differed across the region. A recent study on sub-regions together with BRI countries by Chen et al. (2020) has mainly focused on the efficiency of investment aid towards COFDI without concentrating on the role of pull and push factors in modelling its determinants.

This article is organized into five sections. The second section reviews the relevant theoretical and empirical literature, whereas the third section describes the baseline empirical model using a static and dynamic panel data estimation. Section four summarized the main empirical findings and discussed some robustness checks. Finally, the last section concludes and provides some policy implications of the study.

1. Literature review

Past studies on outward investment are mostly based on theories and research that aim to elaborate on the motives and patterns of outward investment. Many researchers have explained outward investment by the imperfect market (Dunning & Lundan, 2008; Vernon, 1966; Buckley & Casson, 1976). To succeed in overseas markets, multinational companies must have a competitive advantage compared to domestic entities because they are exposed to countless foreign risks including language barriers, cultural differences, foreign exchange risk, and the legal system. The most well-known framework that has been used extensively and is still dominant in research studies is the eclectic paradigm theory by John Dunning (Dunning, 1977). The eclectic approach has three advantages: ownership, location, and internalization (OLI), which can be described as influencing outward FDI decisions (Lokesha & Leelavathy, 2012). The OLI framework is categorized into four FDI motivations: market-seeking, resource-seeking, efficiency-seeking, and strategic-asset-seeking, thereby acting as a criterion for deciding whether to engage in outbound investment activities.

Pull and push factors are generally accepted as the main factors that determine the inflow of FDI. Pull factors refer to the host's endogenous characteristics based on the economic development in its emerging economy that attracts capital flow or direct investment from foreign countries. Pull determinants are further related to host countries' political, economic, and social environment that attract home countries' investment (Carvo et al., 1996; Femandez-Arias, 1996). These determinants can be summarized into three categories, i.e., the business environment, economic and trade factors, and market systems and regulation (Sekkat & Veganzones, 2007). In addition, Li et al. (2019) found that economic freedom (EF), the interaction of EF and institutional instance, bilateral trade, GDP, and patent are significantly influenced the China OFDI in 12 BRI countries. Their findings also demonstrate that EF and economic development exert the inverted "U" effect on OFDI in the different regime.

On the other hand, push factors are categorized as structural factors in the domestic economy that intend to attract FDI into host countries. Attractive economic conditions in the developing countries will motivate foreign investors to establish their companies in the host countries (DeVita & Kyaw, 2008). Yu et al. (2019) noted that the main drivers contributing to COFDI are excess capacity, GDP growth, export growth, credit availability, capital controls, and expectation of renminbi value. Besides, Hatzius (1996) revealed that high labour costs would push the FDI flow out of the country and lower the FDI inflow into the country. It was also mentioned that many firms in Germany pulled out from the government to restructure their costs as the firms were facing excessive cost levels. Bayraktar-Saglam and Boke (2017) investigated the interaction between labour cost and FDI and showed that FDI sought to invest in countries with cheap labour.

As an emerging country, China has attracted much attention from various scholars to investigate the main factors that determine their outward direct investment. Some have examined the view of essential stakeholders on COFDI. For instance, Wahed and Rahman (2018) studied the local business community, the labour community, and policymakers' role in influencing the FDI from China to Bangladesh. The findings showed that the business community is an essential stakeholder with its own interests and can influence government policies to attract the China investment. Another study by Wu and Chen (2019) focused on the impact of COFDI on trade linkages and discovered that COFDI positively affects import intensity but incurs opposite effects on export intensity in BRI countries. A recent study by Goh et al. (2020) examined an asymmetric relationship between FDI-economic growth nexus in Asian regions, namely Asian Developed countries, the newly industrialised Asian Countries and Emerging Asian Giants. The main results revealed that their economic growth is vulnerable to the fluctuation of FDI inflows. In addition, Yue et al. (2018) studied the extensive and intensive margins of trade and revealed the intensive margin of trade could affect COFDI compared to the extensive margin of trade. The studies on international trade and FDI flows in different geographical regions extensively used gravity models to explain the link between these variables (Kumaran et al., 2020; Fan et al., 2016; Yue et al., 2018; Shahriar et al., 2020). A recent study by Chen et al. (2020) used an expanded gravity model and panel threshold to analyze the interconnection on investment facilitation and CODFI. Presently, there is no specific model to explain FDI flows (Armstrong, 2011).

COFDI by the MNC's in China remains unknown and keeps changing according to current development since they are still fresh investors. Wang et al. (2014) argued that the COFDI brings massive job creation with less technology transfer, mass capital and new market in China, and trigger deterioration in misconduct of corporate social in the host countries. However, this may be only temporary because of the three-phase adjustments. For this reason, the study of determinants of COFDI is essential because it is in line with the current economic development in BRI countries with their friendly investment policy for the China investors (Fan et al., 2016). This has been the main driver for our motivation on COFDI's determinants in BRI countries, despite some recent empirical studies that have produced controversial results. For example, Kolstad and Wiig (2012) revealed that host countries with larger market sizes, rich natural resources, and inadequate institutional factors were more likely to attract MNCs from China. Cheung et al. (2012) studied the determinant of COFDI on recipient countries in Africa. They concluded that China's outward investment has concentrated on the motives of market seeking and resources seeking. They maintained that the volume of the natural resources in the host country would create a significant impact that may influence China's decision to invest. Fan et al. (2016) argued that COFDI has focused on natural resource-seeking activities. Another study by Li (2014) on Chinese investment, showed that state-owned enterprises are more focused on seeking natural resources in host countries. Consistent with Zhang and Daly (2011), the authors revealed that the host country's GDP growth is positively correlated with China's outward FDI. However, their results contradicted the findings by Kolstad and Wiig (2009), who exerted that the relationship between natural resources and COFDI was insignificant. Additionally, Zhang and Daly (2011) indicated that the host country's interest rate did not affect COFDI decision. A recent study on COFDI by Liu et al. (2017) revealed that the currency rate, market size, trade openness, and infrastructure facility positively influenced COFDI. Further, Buckley et al. (2007) adopted the static panel technique and showed that the host countries' GDP, natural resources, and low labour costs significantly influenced COFDI.

Recent studies that investigate the motive of efficiency-seeking COFDI is still limited in the extant literature (Kumaran et al., 2020). According to Fan et al. (2018), the decrease in relative variable cost abroad caused by increased domestic operating costs related to the home country's labour employment will lead to larger cost savings and greater initiatives in developing outward FDI. Additionally, Dube et al. (2010) showed that the minimum wage increase significantly affected the probability of the firms engaging in outward FDI. If all other variables remain constant, the country that provides sufficient educated skilled workers and with lower labour costs has the higher probability of attracting FDI (Saada et al., 2014). Mumtaz and Smith (2018) also indicated that low labour cost significantly influenced COFDI for emerging and developing countries. Labour cost is the primary consideration for companies when deciding on outward FDI, especially where the host country offers below that of China (Liu et al., 2017).

Several other essential determinants have also been investigated. For instance, Wei and Zhu (2007) identified a positive relationship between trade openness towards COFDI, namely greater openness on trade-related matters motivated by FDI, and trade flows. Roy and Narayanan (2017) indicated that investment would be more costly in poor institutions and countries with high corruption index, thus eventually reducing FDI inflow. Buckley et al. (2007) showed a positive relationship between risk and FDI with increasing political stability. The volatility and unpredictable inflation rate of a host country are some of the factors that will discourage outward FDI from China. Idowu et al. (2020) revealed that federal government capital expenditure in Nigeria has a significant and positive impact on domestic investment (public and private investment) in the long run, whereas, no significant impact on foreign direct investment (FDI). Sodik et al. (2019) found that resource indicators (labor force and human resources), and competitiveness indicators (electricity, road length, wages, and export) play an important role in attracting the FDI across provinces in Indonesia.

Additional classification studies have been conducted on the opportunities and challenges that would arise in the economy from participating in the BRI projects, particularly in the BRI regions. For instance, more trade opportunities will be created due to the lower transportation costs among BRI countries. For example, landlocked BRI countries in Europe would gain considerably from this advantage. An incomplete transportation link or lack of infrastructure may result in bottlenecks and consequent higher trade costs. If China were to identify free trade zones along the BRI regions, the advantage of the European Union will be reduced as compared to Asian BRI countries that will stand to gain from the substitution of EU trade with regional countries within the belt and road since their intra-regional trade tariffs will be dismantled (Herrero & Xu, 2017). It is believed that the initiatives can provide considerable mutual benefits to both China and Eurasia (Kaczmarski, 2017). By contrast, countries with a higher aid in investment (Europe) revealed healthy preliminary growth and stable development. Conversely, countries with lower investment support (Central Asia and Western Asia) showed sluggish growth and marginal change. One study also revealed that BRI initiatives could escalate agricultural trade between China and the Central Asian region and enhance the bilateral trade growth based on regional policies and measures (Ma et al., 2017). Further, it has been recently shown that BRI initiatives have significantly increased COFDI in the participating countries (Yu et al., 2019). Fan et al. (2016) found the efficiency level is low in BRI countries and this should considerably increase their potential to attract COFDI.

Based on the discussion above, this study addresses the literature gap regarding the determinants of OFDI in several ways. Firstly, it utilizes a simple and yet advanced modelling estimator to conduct data analysis through static and dynamic panel data models. Past studies have mainly focused on the market and natural resource-seeking factors, thus missing other potential seeking factors. Thirdly, efficiency-seeking may be regarded as a possible seeking factor as COFDI has significantly increased during the last decade. Finally, this study also classifies and compares three other important regions that potentially influence Chinese investment abroad, namely the European, MENA, and Asian areas that have not been previously investigated.

2. Methodology

2.1. Data and variables description

As mentioned previously, the objectives of the study are to examine the impact of the minimum wage, political risk, investment risk, and business environment through augmenting the Dunning theory on FDI outflow from China to BRI economies. In total, 50 BRI countries (see at the Appendix) were evaluated in this study, using data collected from 2005 to 2016 (Table 1). However, the remaining data for another 14 BRI host countries were not included in this study as the data were incomplete.

Table 1. Determinants of Chinese OFDI

Variable	Proxy	Descriptions / Used by the Previous Author	Expected sign	Data Sources
LOGCOFDI	Annual China Outward Foreign Direct Investment (US Million)	This dependent variable represents the COFDI to the host countries during 2005–2016 expressed in U.S dollars (millions).		Circular Economy Innovation Communities (2017)
LOGGDP	GDP (million, (constant 2010 US$)	This variable represents the market potential or absorptive capacity of the host country. The data is in constant 2010 U.S dollars. The variable has been used by Buckley et al. (2007) who found a significant positive relationship.	+	World Bank Data (2017c)
NR	Natural resources [fuel export (% of merchandise export), and ores and metal export (% of merchandise export)]	Natural resources are the sum of fuel export (% of merchandise export) and ores and metal export (% of merchandise export). This variable represents the abundance of natural resources in the host country. The variable is used by Buckley et al. (2007) who found positive but non-significant relationship.	+	World Bank Data (2017b, 2017g)
LOGLC	Labour cost [GDP per capita (constant 2010 US)]	Real GDP per capita in the U.S dollar was used as a proxy for real wages. It measures the labour cost in the host country, and it is widely used to measure the advantage of attracting foreign manufacturing firms. The variable used by Liu et al. (2017) who found labour cost was not responsive to COFDI in BRI countries.	–	World Bank Data (2017d)
LOGPTN	Total Patent Application [Patent applications, residents and Patent applications, non-residents]	This variable represents strategic asset-seeking. It is the sum of Patent applications, residents and Patent applications, non-residents. The data represent the number of patent applications by residents and non-residents in each country for exclusive rights to an invention of a product or process that provides a new way of doing something or offers a new technical solution to a problem. The total patent application was not standardized by size of population, following Buckley et al. (2007), Nordin and Nordin (2016), and Li et al. (2019).	+	World Bank Data (2017h, 2017i)

End of Table 1

Variable	Proxy	Descriptions / Used by the Previous Author	Expected sign	Data Sources
LOGMW	China's Minimum Wage (Statutory nominal gross monthly minimum wage – Harmonized series – Annual)	This data refers to employees' statutory minimum monthly gross earnings as of December 31st of each year, presented in nominal terms. It measures China's labour cost and her decision to invest in the low labour cost countries. Fan et al. (2018) found that COFDI's growth is about 32.3%, with a 1% change in the minimum wage.	+	International Labour Organization (2017)
WGI	Worldwide Governance Indicator	This variable is an alternative form of the Institutional Factor (IF) variable from ICRG. The data consists of six main components covering political and social attributes: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Rule of Law, Regulatory Quality, and Voice and Accountability. The score is averaged out from –2.5 to 2.5, with a positive score indicating a lower political risk. This variable was used by Kolstad and Wiig (2012) who found non-significant results on COFDI. However, the interaction between institutions and resources shows significance and negatively influences COFDI.	+	World Bank Data (2017j)
INF	Inflation rate [Inflation, consumer prices (annual %)]	Inflation refers to the annual percentage consumer price index that reflects the annual percentage change in the cost to the average consumer of acquiring goods and services. Kolstad and Wiig (2012) found non-significant effect of inflation on COFDI. On the contrary, Buckley et al. (2007) found a significant effect of inflation but different sign from his hypothesis.	–	World Bank Data (2017e)
OPEN	Trade openness [Exports of goods and services (% of GDP) and Imports of goods and services (% of GDP)	This variable is measured by the ratio of the sum of exports and imports to the GDP of the host country. It represents the economic and trade links between the host country and China, which are essential factors affecting FDI-related barriers. Liu et al. (2017) have shown positive and significant coefficients, while Kolstad and Wiig (2012) show a contradictory result.	+	World Bank Data (2017a, 2017f)

2.2. Variables description

2.2.1. Dependent variables

The dependent variable is the FDI outflow from China to BRI economies that is measured in log form (LOGOFDI). Since some of the COFDI data in BRI is a negative value, the FDI variable will be modified according to the methodology proposed by Busse and Hefeker (2007). Therefore, the net outward Foreign Direct Investment is transformed as follows:

$$Y = \ln\left(X + \sqrt{\left(X^2 + 1\right)} \right). \tag{1}$$

2.2.2. Independent variables

The independent variables that account for COFDI are both pull and a push factors comprising the gross domestic product (GDP), natural resources (NR), labour cost (LC), total patent (PTN), minimum wage (MW), political risk (WGI), inflation (INF) and trade openness (OPEN). According to Liu et al. (2017) and Fan et al. (2018), MW is a push factor, and others are pull factors for the COFDI. All the data are measured in log form except NR, WGI, INF, and OPEN. Table 1 summarises description of the variables, expected signs for the explanatory variables on COFDI, and data sources.

2.3. Estimation strategies

2.3.1. Static panel data

The data structure consists of many countries (N) for the period (T) and comprises non-balanced data, with a short panel data analysis chosen for the estimation. This data structure has been used in several past empirical studies on modelling the investment behavior of MNCs; for example, Buckley et al. (2007), Zhang and Daly (2011), Kolstad and Wigg (2012), Liu et al. (2017), and Yu et al. (2019). According to Law (2018), there are five main advantages of using panel data analysis. First, it provides a better technique in controlling for individual unobserved heterogeneity. Second, panel data provide more information of data sets (large sample) due to pooling individual unit and time dimension. Third, panel data also provide the better framework to examine the dynamics of adjustment process. Fourth, identification of parameters that would not be identified with pure cross-section or pure time-series, and finally, it is useful to analyze the firm-level or company dataset. Given these advantages, three competing formulations are used in modelling static panel data, namely the Pooled Ordinary Least Square (POLS), Fixed Effects Model (FEM), and Random Effects Model (REM).

POLS is defined as the estimation of Ordinary Least Square (OLS) regression for the pooled data based on the equation as shown below:

$$\begin{aligned} \mathrm{Log}COFDI_{it} &= \beta_0 + \beta_1 NR_{it} + \beta_2 \log GDP_{it} + \beta_3 \log LC_{it} + \beta_4 \log PTN_{it} + \\ &\beta_5 \log MW_{it} + \beta_6 WGI_{it} + \beta_7 OPEN_{it} + \beta_8 INFLATION_{it} + \mu_{it}. \end{aligned} \tag{2}$$

In Eq. (2), COFDI is China's outward foreign direct investment, NR is a natural resource, GDP is Gross Domestic Product, LC is the labour cost, PTN is the log value of total patent, MW is the log value of the minimum wage, WGI is the world governance indicator, OPEN is trade openness, and INFLATION is an inflation rate. The symbol, β_0 is defined as constant, β_1, ..., β_8 are the coefficients for each explanatory variable, μ_{it} is the error term, i is the cross-section (recipient BRI countries from COFDI), and t is the time series. The pooled model (POLS) assumes μ_{it} to be uncorrelated with the explanatory variables, or correlation (μ_{it}, X_{it}) = 0. The standard OLS technique can be used to estimate the pooled model (homogeneity across units). In contrast, the random effect model (REM) has assumed the countries specific (α_i) is uncorrelated with the regressors, i.e. correlation (α_i, X_{it}) = 0. However, the random effect model (REM) will be affected by autocorrelation if OLS is implemented because the standard error is invalid; thus, a standard OLS estimation will be deemed inefficient. Hence, REM will be estimated using GLS by implementing a transformed OLS model using a weighted average of the within and between variations in the data. In comparison with POLS and REM, the fixed effect (FE) model assumes that the individual-specific (α_i) is time-invariant, and is now a part of the constant (intercept), in which specific effects have correlated with the explanatory variables or correlation (α_i, X_i) ≠ 0. The FE model can be estimated using the first difference transformation, which removes the specific effects or it can be used within the estimator by demeaning all variables. Under this method, each mean value will be subtracted from each observation, and subsequently, the OLS method will proceed using the transformed model.

2.3.2. Dynamic Panel System Generalised Method of Moment (SGMM)

The static panel, i.e. the fixed and random effects estimator might provide biased and inconsistent parameters due to various endogeneity issues. As such the GMM method has been adopted to generate more consistent parameters (Bun & Saeafidis, 2013). The static panel estimation is no longer efficient after including the lagged dependent variable in the modelling of COFDI determinants. Some shortcomings from the first different GMM are probable data elimination from first-differencing, reduction in the signal-to-noise ratio, creation of measurement error biases (Griliches & Hausman, 1986), and lagged dependent variables that will contain a unit root. These variables will produce weak instruments in the regressions. GMM (SGMM) was used as a system of choice to estimate the regression in differences combined with the regression in level to overcome the weak instruments. The dynamic model COFDI determinants was adopted as follows:

$$\text{Log}COFDI_{it} = +\delta\text{Log}COFDI_{i,t-1} + \beta_1 NR_{it} + \beta_2 \log GDP_{it} + \beta_3 \log LC_{it} + \beta_4 \log PTN_{it} +$$
$$\beta_5 \log MW_{it} + \beta_6 WGI_{it} + \beta_7 OPEN_{it} + \beta_8 INFLATION_{it} + \alpha_i + \varepsilon_{it}. \quad (3)$$

In Eq. (3), the lagged dependent variable (Log$COFDI_{i,t-1}$) incorporated in the baseline model denotes that a correlation between the explanatory variables and the residual exist since the lag value of COFDI (Log$COFDI_{i,t-1}$) rely on the BRI countries' specific effect (α_i). The estimation of this dynamic panel in Eq. (3) suffers from bias (Nickell, 1981) due to this correlation. If T is sufficiently large or approaching infinity, then it will die out. A GMM estimator was proposed by Arellano and Bond (1991) to manage the endogeneity issue. Thus, to remove α_i of BRI countries, Arellano and Bover (1995) recommended using the forward orthogonal deviation transformation (Helmert's transformation) method. The purpose is to remove the average of future observations in the first T – 1 observation sample. The key benefit of this method is to preserve the unbalanced panel sample size. First-difference transformation should not be used if certain explanatory variables (x_{it}) are unavailable due to both $\Delta x_{i,t}$ and $\Delta x_{i,t+1}$ being omitted from the transformed data (Roodman, 2009). Thus, the transformed $x_{i,t+1}$ is available for forward orthogonal deviation transformation. This procedure is expressed as follows:

$$x_{i,t+1} = c_{it}\left[x_{it} - \frac{1}{T_{it}}\sum_{s>t} x_{is}\right], \tag{4}$$

where T_{it} is the time-series observations on the country i, c_{it} is the scale factor expressed as $\sqrt{\frac{T_{it}}{T_{it}+1}}$, and $\sum_{s>t} x_{is} = x_{it} + x_{i,t+1} + \ldots + x_{iT}$. Hayakawa (2009) who earlier noted a Monte Carlo simulation application showed that the GMM estimator with the use of forward orthogonal deviation transformation is likely to function better than the first difference transformation. Therefore, the transformation of forward orthogonal deviation was opted in this study to remove the country-specific variable.

However, this transformation creates another bias due to the correlation between the transformed residual and the transformed lagged dependent variable. Likewise, the transformed regressors are correlated to the transformed residual and tend to be endogenous. Hence, three assumptions regarding the regressors are proposed in this study. Firstly, the regressors (X_{it}) are assumed to be a predetermined variable which correlates with the history error or $E\left[X_{it}\varepsilon_{is}\right] \neq 0$ for $s < t$ an $E\left[X_{it}\varepsilon_{is}\right] = 0$ for all $s \geq t$. Secondly, these regressors (X_{it}) will also be assumed to be an endogenous variable which is correlated with the history and current error or $E\left[X_{it}\varepsilon_{is}\right] \neq 0$ for $s \leq t$ and $E\left[X_{it}\varepsilon_{is}\right] = 0$ for all $s > t$. Lastly, X_{it} could be strictly exogenous if $E\left[X_{it}\varepsilon_{is}\right] = 0$ for all t and s, thus remaining uncorrelated with either present, history, or future errors.

Arellano and Bond (1991) and Arellano and Bover (1995) previously proposed the difference in the GMM approach in which the instrument variable (IV) can choose from lagged levels or untransformed explanatory variables as a transformed variable. If the lagged dependent variables and explanatory variables contain a unit root or are persistent over time, the lagged levels of these variables will be weak instruments in the regression (Blundell & Bond, 1998; Alonso-Borrego & Arellano, 1999). Weak instruments indicate a biased estimate in small samples and the presence of a larger variance that occurs asymptotically. Hence, to reduce the spurious estimate or inaccuracy of this difference estimator, a system GMM approach is used to combine both regressions in the first difference and levels (Blundell & Bond, 1998). The instruments for the regression in levels are lagged differences of the corresponding instruments combined with regression in the first difference.

The system GMM can create instrument proliferation. Too many instrument variables can lead to "overfitting" and significantly reduce the test instrument's validity, notably the J-Hansen test on validity instruments. Hence, to restrict the instrument from being proliferated, the instrument's matrix set is reduced into a smaller set. Past researchers, including Beck and Levine (2004), Carkovic and Levine (2005), Azman-Saini et al. (2010), and Karim and Azman-Saini (2013), have implemented this method to overcome instrument proliferation.

A two-step system GMM and forward orthogonal deviation was employed to overcome an unbalanced panel with gaps (Arrelano & Bond, 1995). Furthermore, the two-step approach functions better than the one-step estimator because it has more optimal weighting matrices (Law, 2018). For the validation of robustness, the time dummies model was included, together with some important variables such as the proxy of the exchange rate and dummy variables, including the BRI policy effect before and after 2013 (0 = before 2013 and 1 = after 2013 when the policy took effect). Proper adoption of an instrument will deliver a successful GMM estimator in developing and ensuring unbiased, consistent, and efficient outcomes. Following the system GMM estimation of the data, two diagnostic tests will be conducted. The first test is the Sargan or Hansen test, which is used for testing over-identifying restrictions in the statistical model. It examines the instruments' overall validity and checks whether the instrument variable is correlated with the error term. If the instruments are valid, the instrument variables are exogenous, and the model is unbiased. The second test is the autoregressive (AR) test, known as a residual serial correlation test. This test ensures that serial correlation does not exist among the transformed error terms (ε_{it}) at the AR (2) process. It also ensures that the number of instruments does not exceed the number of the cross-section for further support which indicates the absence of instrument proliferation problem.

3. Empirical results

3.1. Total sample analysis

Table 2 summarises the estimation results of the COFDI determinants to BRI economies using a pooled model (column 1), static panels (FEM in column 2, and REM in column 3), and dynamic panel system GMM estimation (column 4). Based on the Breusch and Pagan Lagrange Multiplier test results, the pooled model is rejected. Conversely, the Hausman test result shows that the REM model is preferable to FEM for examining the coefficient. The estimation results using dynamic panel system GMM estimation revealed that the lagged dependent variables, namely natural resources, labour cost, minimum wage, and governance indicators exerted significant influence on the determinants of COFDI. Almost all the explanatory variables had statistically significant impact on COFDI except for political risk (WGI) and financial risk (INF). However, as shown in column 4, the lagged dependent variable in system GMM is significant. Hence, it thus justified that the model is appropriate in its use of the dynamic GMM (Law, 2018) to interpret the results.

The coefficient of natural resources (NR) was statistically significant, thus the variable positively influenced the COFDI. In REM, a unit increase in the ratio of natural resources per export in BRI economies increased COFDI by 0.0194%. Using the system GMM estimation this finding was also found consistent with the NR positively affecting the COFDI. The result was also consistent with findings of past studies, which indicated that countries rich in natural resources tend to attract foreign investors, particularly China (Chang, 2014; Cheung & Qian, 2009; Kolstag & Wiig, 2012). As previously mentioned, China has a growing population that is expected to deplete domestic natural resources for future production. Thus, a new strategy to anticipate this eventuality is crucial whereby natural resources would be sourced abroad in order to sustain production growth in the future. Additionally, the negative

Table 2. The determinants of China Outward Direct Investment (COFDI) using Augmented Dunning Model (whole sample)

Explanatory Variables	(1) Pooled model (POLS)	(2) Random Effect Model (REM)	(3) Fixed Effect Model (FEM)	(4) System GMM Estimation
Lag of LOGOFDI	–	–	–	0.3755***
				(0.0826)
NR	0.0199***	0.0194**	0.0103	0.0746***
	(0.0047)	(0.0084)	(0.0143)	(0.0229)
LOGGDP	0.5617***	0.5357*	0.7644	1.1926
	(0.1597)	(0.3106)	(2.2307)	(0.8477)
LOGLC	–0.8387***	–0.8587**	1.1815	–2.8795***
	(0.1932)	(0.3659)	(2.3484)	(0.9153)
LOGPTN	0.3486***	0.3621*	0.1113	0.1161
	(0.1189)	(0.2071)	(0.2879)	(0.3265)
LOGMW	1.8900***	1.8596***	1.3909***	1.1644***
	(0.2182)	(0.1782)	(0.3349)	(0.3441)
WGI	–0.5406	0.1671	–0.3344	4.1338**
	(0.3768)	(0.5631)	(0.7984)	(1.8444)
OPEN	0.0180***	0.0096**	0.0008	–0.0002
	(0.0022)	(0.0042)	(0.0073)	(0.0117)
INF	–0.0352*	–0.0122	–0.0065	–0.0050
	(0.0186)	(0.0156)	(0.0162)	(0.0344)
Constant	–4.5543	–2.8570	–20.9393	–3.3266
	(3.4454)	(6.5470)	(40.2460)	(19.4518)
Arellano–Bond test for AR(1)	–	–	–	0.000
Arellano–Bond test for AR(2)	–	–	–	0.381
Observations	363	363	363	323
Number of groups	–	40	40	40
Number of instruments	–	–	–	37
R-squared	0.4160	0.3887	0.0811	–
Breusch-Pagan LM test	0.0000***		–	–
Hausman test	–	0.4104		–
Heteroskedasticity (x^2-stat)	–	–	–	–
Serial Correlation (F-stat)	–	0.4792	–	–
Multicollinearity	–	3.31	–	–
Sargan test	–	–	–	0.845

Note: Standard errors are in parentheses. ***, **, and * denotes the significant level at 1%, 5%, and 10%, respectively. The dependent variable is the outward foreign direct investment from China (COFDI). The independent variable denotes the following: NR – natural resource, GDP – Gross Domestic Product, LC – labour cost, PTN – log of total patent, MW – log of the minimum wage, WGI – world governance indicator, OPEN= trade openness, and INFLATION – inflation rate. For system GMM estimation, the estimation has been collapsed the instrument from lag 2 to lag 4. The forward orthogonal deviation approach proposed by Arellano and Bover (1995) has been used for the data transformation method. The Sargan test revealed that the p-value for the null hypothesis was insignificant (do not reject the null hypothesis), thus indicating that the instruments are valid. AR (1) and AR (2) are the first and second-order autocorrelation for the first difference equations.

effect of labour cost on COFDI was also statistically significant. This observation indicates that China prefers to invest in countries with low labour costs in order to increase their production efficiency. Thus, increasing labour cost harms COFDI. It is therefore implied that a country with high labour cost will be an unlikely target for Chinas investment.

The LOGGDP variable, on the other hand was statistically non-significant despite having a positive effect on investment, thus indicating that China is not motivated by market-seeking factors. Market size represents the purchasing power of a host country and thus plays a vital role in China's decision to invest abroad as it can help increase the profit or return on their investment. However, these economies are still at the initial or emerging phases and has much further development in the future, thus indicating that China's market demand has not yet reached saturation point.

The LOGMW variable was shown to be statistically significant with a positive effect on COFDI, thus indicating that minimum wages (LOGMW) had a positive relationship with COFDI. This observation suggests that China's high minimum wages increased China's OFDI due to lower labour costs in the recipient countries. The wage has an inevitability effect on production costs and plays a vital role for MNC's to decide where to start their operations. The word "Made in China" doesn't mean rock bottom price anymore because the production cost has increased tremendously in the manufacturing sector over the past decade (Liu et al., 2017; Fan et al., 2018).

Similarly, WGI also demonstrated a significant positive relationship, indicating that COFDI is enticed to more stable countries regarding their political risk. However, this finding contrasts to previous studies that have been performed (Buckley et al., 2007; Cui & Jiang, 2009; Kolstad & Wiig, 2009; Ramasamy et al., 2012). This observation implies that China has moved its focus to countries with lower political risks. A country with high-quality governing institutions is more likely to attract investment as their political risk is stable and the rule of law is enforced. This indicates that the Chinese enterprise is sensitive to political risks when deciding to invest in BRI countries. For the control variable, the analysis revealed that China is not aware of BRI countries' financial risk and trade openness due to the insignificance of INF and OPEN.

3.2. Sample splitting according to BRI regions

To further investigate the factors that determine COFDI, the dataset sample was split according to three BRI regions, namely Europe, MENA, and Asia. The main empirical results are summarised in Table 3. However, only the static panel data was performed due to the availability of micro-data in which the unit factor becomes smaller in a group (Arellano & Bond, 1991). The results revealed that the REM model was more appropriate in explaining the determinants of COFDI in the European and Asian regions. In contrast, the POLS model was more suited to represent the MENA region. The Chow test was carried out to differentiate whether there was a country-specific effect between the POLS and FE model for the MENA region. The results were statistically insignificant, thus indicating that the effect was homogeneous for MENA region countries. The REM employed the corrected serial correlation model for the Asian region as it did not pass the serial correlation test.

Table 3. The determinants of China Outward Direct Investment (COFDI) using Augmented Dunning Model (sample splitting by regions)

Explanatory Variables	Europe Regions			MENA Regions			Asia Regions			
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(4)
	POLS	REM	FEM	POLS	REM	FEM	POLS	REM	FEM	RE with correlated serial correlation
NR	0.0275***	0.0169	−0.029	0.029*	0.028*	0.011	0.0169**	0.00374	−0.0048	0.0146
	(0.010)	(0.0219)	(0.0397)	(0.016)	(0.016)	(0.026)	(0.0069)	(0.0013)	(0.026)	(0.0107)
LOGGDP	−0.3883	0.9123	6.962	1.483***	1.499***	−3.622	0.482**	−.0599	−8.00	0.261
	(0.4321)	(0..7831)	(5.553)	(0.451)	(0.465)	(8.017)	(0.242)	(0.400)	(6.379)	(0.348)
LOGLC	0.3781	−0.9822	−4.927	−0.89	−0.908	9.129	−0.152	0.139	7.321	−0.0773
	(0.7316)	(1.4472)	(6.341)	(0.557)	(0.567)	(5.814)	(0.264)	(0.503)	(6.394)	(0.412)
LOGPTN	1.1809***	0.4734	0.00415	−0.18	−0.184	−0.470	0.140	0.474*	0.334	0.295
	(0.2595)	(0.4240)	(0.545)	(0.392)	(0.397)	(0.7375)	(0.180)	(0.286)	(0.411)	(0.254)
LOGMW	1.5633***	1.3949***	0.883	1.73***	1.728***	2.491	2.549***	2.371***	3.11***	2.497***
	(0.3748)	(0.3539)	(0.556)	(0.460)	(0.462)	(1.624)	(0.250)	(0.250)	(0.856)	(0.287)
WGI	0.6913	0.4000	−0.0231	1.609	1.5934	1.455	−2.374***	−1.799**	−2.249*	−2.177***
	(0.6874)	(1.1287)	(1.520)	(1.0212)	(1.027)	(2.13)	(0.504)	(0.865)	(1.249)	(0.758)
OPEN	0.0030	0.0157	0.0251	−0.0025	−0.002	0.005	0.0252***	0.0144***	−0.0084	0.0216***
	(0.0068)	(0.0122)	(0.0162)	(0.0081)	(0.008)	(0.032)	(0.0031)	(0.0052)	(0.009)	(0.00458)
INF	−0.0151	−0.0241	−0.0225	0.0548	0.051	−0.078	−0.00871	0.0100	0.0232	−0.00191
	(0.0255)	(0.0214)	(0.0224)	(0.060)	(0.06)	(0.078)	(0.0290)	(0.0278)	(0.028)	(0.026)
Constant	5.1518	−11.0645	−124.4	−21.889	−22.152*	17.86	−10.75**	0.754	145.5	−6.121
	(5.8799)	(13.4176)	(91.62)	(9.142)	(9.397)	(166.443)	(5.139)	(8.256)	(112.0)	(7.227)
Observations	138	138	138	65	65	65	160	160	160	160

End of Table 3

Explanatory Variables	Europe Regions			MENA Regions			Asia Regions			
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(4)
	POLS	REM	FEM	POLS	REM	FEM	POLS	REM	FEM	RE with correlated serial correlation
Number of groups	–	14	14	–	10	10	–	16	16	16
R-squared	0.4295	0.3732	0.2098	0.5967	0.5966	0.0000	0.570	0.5409	0.005	0.5665
Breusch-Pagan LM test	0.0000***		–	0.2775		–	0.0000***		–	–
Hausman test	–	0.8272			–			0.1217		–
Chow test				0.1849	–	–				
Heteroskedasticity (x^2-stat)	–	–	–	–	–	–	–	–	–	–
Serial Correlation (F-stat)	–	0.2877	–	0.8774	–	–	–	0.0257**	–	–
Multicollinearity	–	5.10	–	7.48	–	–	–	5.88	–	–

Note: Standard errors are in parentheses. ***, **, and * denote significant levels at 1%, 5%, and 10%, respectively. The dependent variable is China's outward foreign direct investment (COFDI). The independent variable denotes the following: NR – natural resource, GDP – Gross Domestic Product, LC – labour cost, PTN – log of total patent, MW = log of the minimum wage, WGI – world governance indicator, OPEN – trade openness, and INFLATION – inflation rate. The REM model explains the determinants of COFDI in the European and Asian regions, while the POLS model explains for the MENA region.

This study's findings indicate that the minimum wage has proven to be a significant factor for all three regions. Additionally, the Chinese are also prone to resource-seeking and market-seeking in the MENA region as they are the largest stakeholder in oil production. Natural resources' significance on COFDI reveals that China wants to secure the supply of major natural resources into their country and control its supply. Besides minimum wages, political risk and trade openness appeared to be significant factors in Asian regions. Moreover, greater political stability will provide greater asset value in return and future value, thus reflecting on Chinese SOEs' tendency to invest in a stable economic environment. China has many large trading partners in Asian countries and can create trade expansion with its existing partners and establish trade with BRI countries.

3.3. Robustness checks

Various alternative estimation strategies have been carried out for robustness checking, summarized in Table 4 and Table 5. In Table 4 (column 1), we have estimated the model by considering a dummy variable (POL) representing the effectiveness of BRI policy before and after 2013. The result is not appealing because negative significance means BRI initiatives do not attract COFDI into the BRI countries after 2013. Since BRI is at its initial path, it does not show the effectiveness of influencing the COFDI. Nonetheless, the most relevant variable, i.e., NR, LOGLC, LOGMW are significant and correctly signed. Next, one control variable, namely the exchange rate, was added to the estimation model (column 2). The results indicated that the push factor of production cost (LOGMW) in the home country was significant and positive, but labour cost was insignificant. Nevertheless, using the time dummies model (column 3) and model without forward orthogonal deviation (column 4), the results proved resilient and not much different from the baseline model. LOGLC and MW were significant with negative and positive effects, respectively, and also significant together with the variables, NR and WGI. Hence, it can be concluded that these results are robust, and efficiency-seeking is the new goal for Chinese firms to implement BRI initiatives.

Table 5 shows the result of dynamic panel quantile regression on the determinants of COFDI represented by the lower group of quantile (0.10 and 0.25), median quantile (0.5), and higher group (0.75 and 0.90). The Quantile regression technique has been used as a

Table 4. The determinants of China Outward Direct Investment (COFDI) using Augmented Dunning Model (whole sample)

Explanatory Variables	(1) Policy Effect	(2) Exchange Rate Included	(3) Time Dummies Model	(4) Model without forward orthogonal deviation
Lag of LOGOFDI	0.390*** (0.0527)	0.3538*** (0.0814)	0.3323*** (0.0489)	0.1804* (0.0983)
NR	0.0761*** (0.0259)	0.0694*** (0.0234)	0.0477*** (0.0091)	0.0794*** (0.0236)
LOGGDP	1.230 (0.958)	0.9613 (1.1361)	0.6157 (0.4555)	2.7715** (1.0812)
LOGLC	−3.344*** (1.161)	−2.4309 (1.6066)	−1.852*** (0.5472)	−3.1843** (1.2279)

End of Table 4

Explanatory Variables	(1) Policy Effect	(2) Exchange Rate Included	(3) Time Dummies Model	(4) Model without forward orthogonal deviation
LOGPTN	0.223 (0.319)	0.0069 (0.5176)	0.1744 (0.2970)	–0.1704 (0.7272)
LOGMW	1.621*** (0.373)	1.0314*** (0.3922)	1.1758*** (0.2415)	1.5992*** (0.3891)
WGI	4.322* (2.467)	3.3894* (1.9764)	1.8148** (0.8336)	4.1937** (2.3391)
OPEN	0.000834 (0.00868)	–0.0012 (0.0127)	–0.0014 (0.0045)	0.0017 (0.0112)
INF	–0.600* (0.347)	–0.0592 (0.0431)	–0.0638*** (0.0216)	–0.0158 (0.0278)
POL	–0.600* (0.347)	–	–	–
LOGRER		0.0599 (0.3385)	–	–
Year_2007 Year_2008 Year_2009 Year_2010 Year_2011 Year_2012 Year_2013 Year_2014 Year_2015			0.2201 (0.2841) 0.7374 (0.2803)*** 0.1549 (0.2964) 0.2895 (0.2895) 0.2055 (0.2354) 0.1619 (0.2638) 0.1191 (0.2223) 0.1449 (0.3034) –0.5522 (0.3498)	
Constant	–3.081 (18.62)	18.9637 (6.5470)	3.7758 (9.4901)	–38.2631 (27.0487)
Arellano–Bond test for AR(1)	0.000	0.000	0.000	0.002
Arellano–Bond test for AR(2)	0.371	0.195	0.312	0.680
Observations	323	310	323	323
Number of groups	40	38	40	40
Number of instruments	40	31	37	37
Sargan test	0.9	0.428	0.446	0.680

Note: Standard errors are in parentheses. ***, **, and * denote significance level at 1%, 5%, and 10%, respectively. The dependent variable is the outward foreign direct investment from China (COFDI). The independent variables are denoted as follows: NR – natural resource, GDP – Gross Domestic Product, LC – labour cost, PTN – log of total patent, MW – log of the minimum wage, WGI – world governance indicator, OPEN – trade openness, INF – inflation rate, POL – BRI policy effect with indicator 1 signifying policy after and at the year 2013, and 0 prior to 2013, LOGRER – log of real exchange rate and year_2007 to year_2015 – time dummies. The Sargan test revealed that the p-value for the null hypothesis was not significant (retain the null hypothesis), thus indicating that the instruments are valid. AR (1) and AR (2) are the first and second-order autocorrelation for the first difference equations.

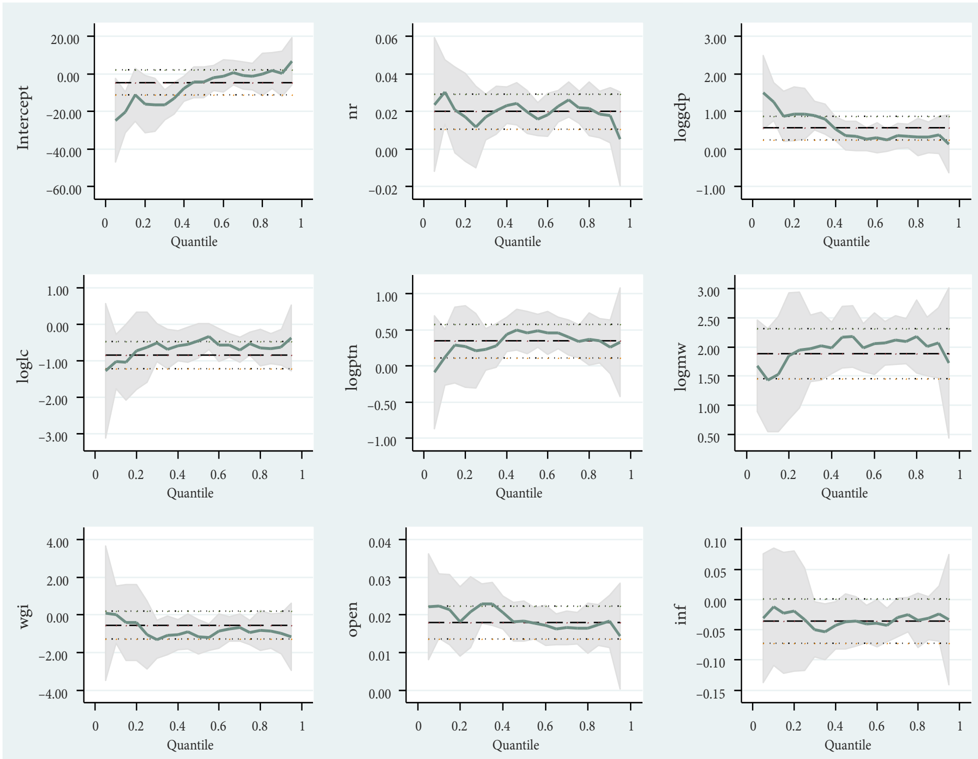
robust regression technique that allows for estimation when the typical assumption of normality of the error term might not be strictly satisfied (Koenker & Basset, 1982; Galvao, 2011; Powell, 2014). Most variables are insignificant at the higher quantile of outward investment except LOGGDP, LOGPTN, and LOGMW. Focusing on the efficiency-seeking effect, which LOGMW represents, we see that the impact has been positive and significant for 25 quantiles and above. The co-movement between COFDI and minimum wage is pretty volatile and merely higher at upper quantiles. Indeed, the trend in correlations among the outward investment determinants does not show uniform across time when different quantiles are considered.

Figure 1 illustrates how the effects of all interest determinants change over the range of quantiles and how the magnitude of the impact at various quantiles differs considerably from each OLS coefficient. The difference from OLS estimation will be significant if the quantile coefficient has not included in the OLS confidence interval. Overall, each determinant has no major significant difference from the OLS estimate because it is close to the dotted line in the diagram. Interestingly, the magnitude of NR and LOGGDP is significantly different from that of the OLS estimates, respectively just after the 90th quantiles and prior to the 10th quantiles.

Table 5. Dynamic panel quantile regression for the determinants of China Outward Foreign Direct Investment (COFDI)

LOGCOFDI	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
NR	–0.003*** (0.001)	0.011*** (0.001)	.0245808*** (0.002)	0.011*** (0.001)	–0.000 (0.004)
LOGGDP	0.366*** (0.097)	0.312*** (0.03)	1.758*** (0.082)	–0.006 (0.119)	–0.612* (0.347)
LOGLC	–0.246*** (0.058)	–0.564*** (0.025)	–1.90*** (0.09)	–1.037*** (0.284)	–0.018 (0.201)
LOGPTN	0.304*** (0.097)	0.278*** (0.035)	–0.846*** (0.054)	0.487** (0.206)	0.437** (0.205)
LOGMW	–0.290 (0.261)	0.456*** (0.082)	0.294*** (0.057)	1.347*** (0.313)	0.827*** (0.065)
WGI	–1.252*** (0.142)	–0.487*** (0.083)	1.256*** (0.166)	0.867** (0.373)	–0.189 0.522
OPEN	0.017*** (0.001)	0.012*** (0.001)	0.020*** (0.001)	0.005*** (0.001)	–0.001 (0.003)
INF	–0.04*** (0.011)	–0.027*** (0.003)	–0.040*** (0.005)	0.0155** (0.006)	0.001 (0.014)
Lag LOGCOFDI	0.508*** (0.064)	0.652*** (0.02)	0.457*** (0.016)	0.238* (0.143)	0.526*** (0.031)
Observations	323	323	323	323	323
No. of group	40	40	40	40	40

Note: Standard errors are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively. The dependent variable is the outward foreign direct investment from China (COFDI). The independent variables are denoted as follows: NR – natural resource, GDP – Gross Domestic Product, LC – labour cost, PTN – log of total patent, MW – log of the minimum wage, WGI – world governance indicator, OPEN – trade openness and INF – inflation rate.



Note: The dependent variable is the outward foreign direct investment from China (COFDI). The independent variables are denoted as follows: NR – natural resource, GDP – Gross Domestic Product, LC – labour cost, PTN – log of total patent, MW – log of the minimum wage, WGI – world governance indicator, OPEN – trade openness and INF – inflation rate and Intercept – constant.

Figure 1. Graphical quantile regression analysis for each determinants of COFDI

Summary and Conclusions

This study empirically examined how the push and pull factors influenced the COFDI into investing in the BRI economies in compliance with the Dunning FDI theory. Since China has lost its comparative advantage as a low-cost producer country due to the increase in her minimum wage, the push factors will motivate the MNC's to reallocate their investment worldwide, particularly in the BRI economies. The study further extended the analysis into exploring how the factors affecting COFDI differed across the BRI regions, namely Europe, MENA, and Asia. Both static, dynamic panel GMM and dynamic quantile regression (for robustness checking) were used to examine the role of push and pull factors in influencing the COFDI in these regions.

The main findings from the study can be summarized as follows. First, natural resources and labour advantages possessed by BRI countries play an essential role in attracting COFDI. BRI countries with rich natural resources and low labour costs are attractive investment destinations given China's resource-seeking motivation and the increasing average wage in the country. Second, institutional factors showed a positive association with COFDI, in which the investment could become costlier and thus reducing investors' interest. Third, the increase in China's minimum wage has reduced the country's competitiveness, and therefore, MNCs from the home countries are now looking for lower and cheaper labour costs in BRI countries. The study showed China's minimum wages are positively associated with her outward FDI. Besides, the minimum wage has proven to be a significant factor in comparing all the three BRI regions. Fourth, apart from the higher market demand, investment in MENA region was also motivated by resource-seeking. MENA region offered better prospects to Chinese investors due to their advantages, particularly in the availability of mineral resources such as oil. Lastly, the Chinese investors were looking for better trade expansion and a stable business environment in the Asian region.

Several policy implications can emerge from this study. First, since China's minimum wage is a push factor, this implied that BRI countries should take leverage by introducing their new wage policy, in particular to the sectors that focus heavily on labour-intensive endeavours and allow foreign equity ownership to attract more productive MNCs from China. Second, policymakers of host countries, particularly in the MENA region, should set up strategies and policies to explore their potential natural resources. It has proved to significantly influence the decision of MNC's from China to invest there. Third, institution factors are also a key driver to attract COFDI. Therefore, the BRI countries, particularly in Asia, should improve their institutional quality by reforming, strengthening, and improving the public sector's delivery system. Finally, the China government need to facilitate her MNCs by providing sufficient financial and non-financial assistance to ensure that they can operate efficiently in the BRI countries. Effective negotiation between China and BRI countries is also essential in creating friendly business cooperation and environment for mutual benefit across nations.

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Compliance with ethical standards

It is declared that all authors harbour no conflict of interest in conducting this research. The authors have contributed significantly to writing this manuscript.

Data statement

The data that support the findings of this study are available and accessible online except for China direct investment abroad. China direct investment data were subscribed from the CEIC database. We have annotated the entire data collecting process presented in this paper. Below we outline our approach for building the dataset for the analysis.

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APPENDIX

Table A1. The BRI countries observed in this study

Afghanistan	Mongolia
Azerbaijan	Myanmar
Bahrain	Nepal
Bangladesh	Oman
Belarus	Pakistan
Bosnia and Herzegovina	Philippines
Brunei	Poland
Bulgaria	Qatar
Cambodia	Romania
Croatia	Russia
Czech Republic	Saudi Arabia
Egypt	Serbia
Georgia	Singapore
Hungary	Slovakia
India	Sri Lanka
Indonesia	Syria
Iran	Tajikistan
Iraq	Thailand
Israel	Turkey
Jordan	Turkmenistan
Kazakhstan	United Arab Emirates
Kuwait	Ukraine
Kyrgyzstan	Uzbekistan
Laos	Vietnam
Malaysia	Yemen