

**Relationship between Gross Domestic Product, Employment,
Foreign Direct Investment and Covid-19 among World Countries
– A Comparative Study between Pre and Post Covid Period**

By
Gopika Sivaprakash
(20PEC003)

Thesis Submitted to
Avinashilingam Institute for Home Science and
Higher Education for Women,
Coimbatore – 641 043.

In Partial Fulfilment of the Requirements for the
Degree of Master of Arts in Economics

May 2022

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Certified as a Bonafide Research Work


Signature of the
Supervisor


Signature of the
Head of the Department

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CHAPTER - 1

INTRODUCTION

The definition of FDI is not only limited to a simple transfer of money, but has now extended to being defined as a measure of foreign ownership of domestic productive assets such as factories, land and organizations and other intangible assets like technologies, marketing skills and managerial capabilities. Economic literature has been dominated by FDI over the last 30 years, especially the developmental areas of economics due to the highly receivable potential benefits of a host country. The effects experienced spread over a wide range, from influencing production, generation of employment, change in income levels, import and exports, impact on economic growth, balance of payments and general welfare of the host country.

FDI was found to have emerged in India since the British rule but its presence was considered negligible. It was natural for India to consider foreign capital as one of fear and suspicion as the British played an exploitative role by ‘draining away’ resources from the country. (Ansari and Ranga, 2010).

There have been many arguments stating that inflows of FDI improves the economic growth, and consequently enhances employment opportunities. FDI provides technological advances (increasing GDP) and widens the scope for the domestic market (increasing employment).

Foreign direct investments have been regarded in the last years by the governments of the developing countries as one of the best alternatives to fuel their economic growth. In these circumstances, identifying the main characteristics of a state that are important for foreign investors and also analysing the influence of the foreign direct investments on the characteristics of an economy, has become of significant interest for the policymakers, the economists and also for the academic environment. Moreover, the foreign direct investments have been regarded by the authorities from the ex communist countries as being an important source for management skills, for new and better paid jobs and for products and services of an improved quality which could increase both the internal market and also the export potential of their economy. Among the determinants of the foreign direct investments identified by the literature, the macroeconomic stability is becoming, together with corruption, political stability and

quality of legislation, more and more important in the nowadays conditions. Therefore studying such a linkage, between the inflows of foreign direct investments and the macroeconomic stability of a country, is of an increased importance today.

Coronavirus disease (COVID-19) was first reported in Wuhan, People's Republic of China in December 2019 and spread worldwide. In an attempt to control the spread of the virus, many countries introduced social distancing and lockdown orders and imposed entry bans on foreigners, severely curtailing economic activity. According to the International Monetary Fund (2021), the global economy in 2020 contracted 3.2% and global trade by 8.3%. The pandemic caused a more dramatic fall in foreign direct investment (FDI) in 2020. According to United Nations Conference on Trade and Development (2021), global FDI flows dropped by 35% to \$1 trillion in 2020, from \$1.5 trillion in 2019. Thus, in 2020, global FDI decreased more considerably than global gross domestic product or trade. FDI is often vulnerable to economic and various other types of shocks. Past studies have noted the negative effects of financial crises (Dornean, Işan, and Oanea 2012; Dornean and Oanea 2015; Poulsen and Hufbauer 2011; Stoddard and Noy 2015) and disasters triggered by natural hazards (Anuchitworawong and Thampanishvong 2015, Escaleras and Register 2011) on FDI. Financial crises lead to liquidity constraints for investors, whereas disasters triggered by natural hazards destroy physical infrastructure such as roads and industrial parks.

Compared with these shocks, one of the most distinctive features of the COVID-19 pandemic is the forced adoption of infection prevention measures such as lockdowns and social distancing. These measures raise the costs for pre-investment investigation, searching costs for location and workers, and running costs of FDI. Moreover, the COVID-19 pandemic has yet again illustrated the vulnerability of global trade and value chains to external shocks. When a country in the global value chain suffers a big COVID-19 outbreak leading to shutdowns of its factories, the entire global supply chain can be disrupted. To minimize and diversify the risk of disruptions, many companies have been tempted to reduce their reliance on concentrated production in foreign countries (Lee and Park 2020). A potential shift in the direction and patterns of global supply chain could affect FDI decisions given the complementarity between intermediate goods trade and FDI (Carril-Caccia and Pavlova 2018; Aizenman and Noy 2006; Hanson, Mataloni, and Slaughter 2005; Kumar 1994). The studies measured the severity of COVID-19 damage using three indicators—the number of confirmed cases,

the number of deaths and the stringency index of government policies that restrict people's activities. The impact of these COVID-19 indicators on green field FDI and cross-border mergers and acquisitions (M&A). FDI flows are measured by number of cases or deals and the US dollar values in the manufacturing and service sectors.

The ongoing coronavirus pandemic (hereinafter, COVID-19) has disrupted global value chains (Global Value Chain) worldwide since its beginning. The decrease and delay in materials exported from China has resulted in decreases in production or changes of input sources in many countries. For example, according to an interview survey by the Japan External Trade Organization (JETRO), a Mexican affiliate of a Japanese firm was forced to switch its input sources from China to South Korea. Moreover, the decrease or delay in exports from China has decreased production in ASEAN countries, resulting in a reduction of their exports to Japan. According to the results of a questionnaire by the Japan Institute of Logistics Systems, as a result of the difficulty in importing goods from these countries, a Japanese firm switched its input source to domestic suppliers. These induced switches of input sources negatively affect firms' operations and reduce their exports of final goods. The extent to which countries' exports of final goods have been disrupted since COVID-19 began affecting supplier countries. Conceptually, a supplier country that is affected by the spread of COVID-19 experiences a drop in the production of inputs. The resulting decrease in the amount of exported inputs and their increased price raises importers' costs and reduces their productivity in terms of final-good production. This, in turn, reduces the export of the final goods from the input-importing countries to other countries. Thus, the trade-reducing effect of COVID-19 spreads throughout Global Value Chain. On the supply side, the decreased workforce and diminished productivity in exporting countries reduce the supply of final products. On the demand side, decreased earnings and lockdown measures in importing countries reduce the demand for final products.

The empirical estimation showed that, the world exports of finished machinery products decreased from US\$1,551 billion to US\$1,287 billion. To measure the prevalence of COVID-19, it was used the number of COVID-19 cases and deaths collected by the European Centre for Disease Prevention and Control. Using these data, it was investigated three country scenarios to capture pandemic-related economic damage to the GVC: (1) a country that imports finished machinery products; (2) a country that exports finished machinery products; and (3) a country that exports

machinery parts to the country exporting finished machinery products. These three country scenarios capture demand, output, and supply chain effects, respectively. It was empirically investigated which of these effects has the largest impact on international trade during the COVID-19 pandemic period.

The summary of the findings are given as under. First, COVID-19 did not have a significant effect on demand for finished machinery products in importing countries, whereas the finished machinery trade is significantly hurt by higher rates of COVID-19 infection in both countries exporting finished machinery products and countries exporting machinery parts to those countries. In short, the impacts of COVID-19 are primarily on the supply side, affecting both the outputs and inputs that play a crucial role in machinery trade; the impacts on demand play a less significant role. In particular, it was found that the supply chain effect has greater impact on the finished machinery trade compared with the output effect. Second, the output effect is not so strong when looking specifically at intra-Asian trade. This may be because some Asian countries exempt the machinery industry from workplace-closure orders due to its importance in the economy.

The literature on GVCs is growing rapidly. Among many studies in this area, the following studies have examined the impacts of COVID-19 on GVCs. Inoue and Todo (2020) simulate the economic effect of a possible lockdown of Tokyo on production not only in Tokyo but also in other parts of Japan, through supply chains. They demonstrate that were Tokyo to be locked down for a month, the indirect effect on other regions would be twice as large as the direct effect on Tokyo, leading to a total production loss of 5.3% of the annual GDP. A similar analysis was conducted for the United Kingdom by Pichler et al. (2020), which sheds light on input–output linkages across sectors. George et al. (2020) focus on the epidemiological dynamics, that is, the transmission of diseases across countries and industries, through supply chains. Bonadio et al. (2020) estimate that the COVID-19 shock is expected to decrease real GDP by 29.6% on average, and a quarter of the total is due to transmission of the shocks through GVCs. These recent studies performed simulation analyses of the effects on Global Value Chain.

The impact of the COVID-19 crisis on working lives is enormous. As the virus spread across the globe in the early months of 2020, it was quickly witnessed fundamental changes to our work and social lives. Across the world, millions of workers suddenly found themselves unemployed or furloughed as businesses struggled to meet

costs (Lewis and Hsu, 2020). The full economic impact of the pandemic is yet to be determined, but it will be significant (see Keogh-Brown *et al.*, 2010). Displays of emotions in the workplace have increased, and tensions have become heightened as society struggles to adjust to widespread illness and death of friends, family and colleagues (Williams, 2020). It was expected radical changes in the areas of skills, employment levels, work patterns, the content of jobs and occupational structure. There will be no turning back; the seeds of fundamental change have already been sown. New technology is perhaps the most important issue that has ever faced workers and trade unions. (Gill, 1986). These points are now as pertinent as they ever have been as people experience radical disruption to the ways in which they work. As noted by Donnelly and Proctor-Thomson (2015: 48), ‘Disasters disrupt the nature of work, creating a culture of ambiguity with shifting priorities for individuals, organisations and their wider communities. Operating within subsequent uncertain environments promotes a reassessment of the spatial configuration of work and the adoption of new ways of working’.

In the UK, workers were divided between those deemed ‘critical’ (‘key’ or ‘essential’) and those working in businesses or sectors that were forced to close as the Government announced that ‘All employees should be encouraged to work from home unless it is impossible for them to do so’ (Department for Business, Energy and Industrial Strategy, 2020). Those deemed ‘key’ or ‘essential’ workers continue to see the enduring impact of technology on working lives, in terms of control, consent and resistance (Ellway, 2013; McCabe, 2014), as the pressures of working under such conditions are heightened from their already existing levels (Carter *et al.*, 2011). The public debate about ‘key workers’ will no doubt see increased emphasis placed on the importance of the *foundational economy* in the coming months and years across the UK and beyond (Leaver and Williams, 2014; Dobbins, 2020; Sisson, 2020). For those deemed non-essential, working from home suddenly became a reality for a vast number of workers, many of whom had been told for some time that flexible work was not an option. There is however a danger of working from home being presented as a panacea in the current context, when research shows that this is actually far from the truth (Mann and Holdsworth, 2003; terHoeven and van Zoonen, 2015; Messenger and Gschwind, 2016; Lehdonvirta, 2018). Industrial relations research more broadly has been accused of suffering from an ‘historical and conceptual amnesia’ (Lyddon, 2003: 101)—

a criticism which has also been levelled at studies on technological change and its impact on work (Gilbert, 1996). More recently, it has been claimed that employment relations research possesses ‘far too little grasp of the past, and its fixation on the present is a continuing weakness’ (Funnell, 2011: 170). The current crisis presents us with the opportunity to reflect on legacies of existing research on the many different dimensions of work and employment. Before rushing into research on the current crisis, there is a need for a more retrospective and reflective approach to understanding issues central to new technology, work and employment if we are to make sense of changes brought about in response to COVID-19. Therefore, it is vital for academics, researchers and policy makers not to reinvent the wheel and utilise the vast array of existing research as a tool to help take stock of the impact of technology on changes to working practice imposed by the virus.

The impact of technology on work force was analysed by Howcroft and Taylor, 2014. As technology advances, notions of what is ‘new’ have continued to evolve, and it is crucial to have an expansive view of new technology (see also Holtgrewe, 2014), whilst at the same time acknowledging that the implications of these technologies are the product of human agency. Therefore, there is a need to reconsider how the existing labour process and work and employment research has mapped these contours over time. As many workers have become ‘estranged’ from their workplaces, it is important to recall early reflections of Marx, who noted ‘the worker feels himself only when he is not working; when he is working he does not feel himself. He is at home when he is not working, and not at home when he is working’ (Marx, 1844/1975: 326). Whilst Marx was specifically writing about the alienation of labour, the point remains valid and is particularly pertinent during the current crisis. Grounding our understanding of current experiences of work must begin with an understanding of the employment relationship and structured antagonism to enable us to begin ‘examining the labour process as both a condition and consequence of new technology’ (Burnes *et al.*, 1988: 1; see also Briken *et al.*, 2017). This is crucial so that the debate does not disregard the importance of previous interventions and fall solely into a sanguine view of the role of technology, rolled up in unitary debates about human resource management, commitment and engagement (Dundon and Rafferty, 2018). It is argued that prior understanding of these issues will provide a useful starting point for understanding the recent changes as many adapt to their new environments.

The number of COVID-19 deaths is reported to have exceeded 2.8 million across the world (as of April 1, 2021). While policies taken against the pandemic differ from one place to another, there are two divergent views on the effect that different political regimes may have in preserving national public health. Some scholars argue, on the one hand, that democratic governments are disadvantaged in combating the spread of formidable diseases, like COVID-19, because the respect for individual rights and freedom precludes them from taking aggressive or drastic measures which their authoritarian counterparts could adopt (Alsan et al., 2020; Norheim et al., 2020; Thomson & Ip, 2020). A series of recently published papers show that democratic countries suffer from more COVID-19 deaths than authoritarian states (Cepaluni et al., 2020; Cheibub et al., 2020; Frey et al., 2020). Cassan and Steenvoort (2020) called this line of literature the “efficient autocracy” view.

For those scholars who uphold the legitimacy and core values of modern democracy, on the other hand, the claim that non democracies are better at coping with the pandemic remains unconvincing. It has been reported, for example, that some authoritarian leaders, like Alexander Lukashenko in Belarus, blatantly underestimated the risk of the new virus and failed to adopt countermeasures in a timely and appropriate fashion. It was reported low casualty rates in these countries (Karáth, 2020), therefore, might not be attributable to decisive actions and interventions taken by their governments. Besides, it is difficult to imagine, more fundamentally, that authoritarian states' healthcare systems would work better than those of democratic countries. The conventional wisdom in the relevant literature suggests the opposite indeed, as scholars have found that people in democratic countries are likely to have better health than their authoritarian counterparts (Gerring et al., 2020; Kavanagh and Singh, 2020; Wang et al., 2019).

One possible reason that may account for the apparent authoritarian advantage is that authoritarian countries manipulate death data. Cassan and Steenvoort (2020) called this line of reasoning the “biasing autocracy” view. Kapoor et al. (2020), for example, analyzed the moving average of the reported number of deaths in authoritarian countries, revealing that the published data are likely to be unnaturally produced. Adiguzel et al. (2020) also reported a similar result for the governmental statistics of digit-based tests.

In this backdrop, the studies attempted to analyse the relationship between COVID 19 and foreign direct investment, employment. But they did not analyse the relationship between COVID 19, foreign direct investment and employment simultaneously and compare the relationship among the above variables between pre and post COVID period. The research gaps were taken care of in the present study on **“Relationship between Gross Domestic Product, Employment, Foreign Direct Investment and Covid 19 among World Countries – A Comparative Study Between Pre and Post Covid Period”**.

The following are the specific objectives of the study.

Objectives

- To analyse the Foreign Direct Investment Inflow, Outflow and Employment among the world countries
- To assess the COVID cases and death under COVID cases among the countries
- To compare Foreign Direct Investment Inflow, Outflow and Employment and Gross Domestic Product between pre and post COVID period
- To study the relationship between Foreign Direct Investment inflow and outflow and employment among the developed, developing and less developed countries

Hypothesis

The following null hypotheses were tested to fulfil the objectives of the study

1. The Foreign Direct Investment inflow, outflow and employment did not differ significantly between pre and post COVID period
2. Gross Domestic Product was independent of foreign direct investment inflow, outflow and employment in both pre and post COVID period
3. There is no direct and indirect relationship among foreign direct investment inflow, outflow and employment.

CHAPTER - 2

REVIEW OF LITERATURE

The review of literature relating to “**Relationship between Gross Domestic Product, Employment, Foreign Direct Investment, And COVID-19 among World Countries – A Comparative Study between Pre and Post COVID Period**”, is discussed under

2.1. Studies on Covid-19 and Foreign Direct Investment Inflow and Outflow

2.2. Studies on Covid-19 and Employment

2.3. Studies on Covid-19 and Gross Domestic Product

2.4. Other Covid-19 Related Studies

2.1. Studies on Covid-19 and Foreign Direct Investment Inflow and Outflow

Covid-19 as a sudden and un predicted incident has affected the Foreign Direct Investment inflow and outflow in countries across the globe. In this section, the researcher has tried to provide various literature works carried on the impact of COVID-19 on Foreign Direct Investment and Employment.

In a study made by Aggarwal (2020) stated that Covid-19 has battered the global economy causing the worst recession since The Great Depression of the 1930s. By the end of 2020, the worlds GDP maybe about 7.5% lower than it would have been without the pandemic. Globally more than 15% of the young people who were in work before the Covid-19 have lost their jobs. Widespread lockdowns have caused changes that were already affecting the world economy in technology, finance and trade. With great deal of uncertainty in the transactional space, investors are now more cautious before making any making any significant transactions. Global FDI flows fell by more than 49% in the first half of 2020 and even under the most optimistic scenario after the economic support policy measures by the governments, the numbers don't seem to be getting better. The developing countries are hit even worse because the sectors attracting the largest shares of FDI such as primary and manufacturing sectors are hit the worst. FDI being a critical driver of the economic growth could play an important role in supporting the economies during and after the crisis.

Social-distance policy of most governments and the pandemic impact of corona virus (COVID-19) on human health are expected to shutter international investment and business environment. However, there is little or no study to show the early empirical evidence on this relationship, most especially its impacts on FDI flows in the economies. This note provides a preliminary evidence of the impact of COVID-19 on FDI outflows. Ajide et al. (2020) used data cover cross-sectional first quarter, average data; between 1 January – 31 March, 2020 from 43 countries. Using Ordinary least square (OLS) and Quantile regressions, it was documented that there is a positive relationship between COVID-19 confirmed cases and FDI outflows. In addition, there is a positive impact of COVID-19 related confirmed deaths on FDI outflows across all quartiles estimations. This means that COVID-19 pandemic fuels the foreign direct investment outflows. The major causes could be the reduction in the ability of firms to invest due to a shortage in the number of skilled employees because they care for their health safety, a decline in corporate profits and increase in cost of finance. In addition, the propensities to invest have been widely affected negatively in most economies. These factors also become obvious when most economies experience a very high level of risk perception in financial market.

Foreign direct investment (FDI) movement to any country is recognized as an important criterion for economic strength and potentiality. Hence, the Chattopadhyay et al. (2022) studied the motives of FDI inflows through the determinants and channels, namely horizontal or vertical FDI and the impact of COVID-19 on FDI Inflows in BRICS countries during the period 1990–2020. The Kinked Exponential (deterministic) trend, and Zivot and Andrews' trend equations are applied for the growth analysis of FDI inflows. Regarding the estimation of channels of FDI inflows in terms of horizontal, vertical, and hybrid motivations, dynamic panel data analysis using GMM for BRICS economies together and ARDL-PMG for individual countries is made. The findings show significantly positive growth in FDI inflows in all BRICS countries except India during the first decade of the present century. After that, these countries have experienced either significantly or insignificantly declining trends, except India, where the trend has significantly increased during this later period. From the overall analysis, it was found that both horizontal and vertical motivations play a dominant role in determining FDI inflows for the BRICS countries. However, from country-wise estimations, it is observed that both horizontal and vertical motives are dominant factors

for FDI inflows to India and Russia. In contrast, the horizontal motive of it is significant for China. For Brazil and South Africa, no motive behind FDI inflows appears significant. The pandemic situation significantly impacts attracting FDI in Brazil, while it remains insensitive in the rest of the BRICS countries. The findings revealed that FDI determinants are country-specific. So, the BRICS countries can design proper FDI policy and adopt more reforms in attracting FDI that may help improve their economic situation.

Hysa et al. (2022) aimed to reconsider the role of foreign direct investment determinants for European national development and to analyse the impacts of the pandemic situation caused by COVID-19. Foreign direct investment is a source of development; therefore, this study includes empirical applications, specifically the random effect model, for EU countries, during the pandemic period. This study provides some valuable conclusions regarding the changes caused by the main determinants of foreign direct investment, such as unemployment, interest rates, economic growth, inflation, and business confidence. Additionally, the proxies of COVID-19 are the number of cases and number of deaths, both appearing to positively contribute to FDI outflow, the former with a higher impact than the latter. Based on the availability of the data, this paper deals with 22 European Union countries for Q1, Q2, and Q3 of 2020. Data for all the chosen variables were not available for the fourth quarter (Q4); thus, this period was not considered, which constitutes a limitation of this study, but confirms the need for robust FDI inflows to support the sustainable post-pandemic development recovery of less-developed EU countries. As the need for external funding sources, i.e., FDI inflow, grows in times of crisis, governments should take suitable measures to uplift the confidence of socially responsible foreign investors during difficult times generated by black swan events. There is almost no detailed research regarding the impact of COVID-19 on FDI flows received by European Union countries.

Doytch et al. (2021) studied the trends and fluctuations in green field foreign direct investment (GFDI) during the first wave of the COVID-19 pandemic crisis on a global scale. It was analysed the data set of GFDI provided by FDI Markets (Financial Times) to understand the contraction of GFDI during the first three quarters of the year 2020, taking into account the sector of the investment and the host and home country. We analyse both the long-run trends and the quarter-over-quarter changes in GFDI to capture its fluctuations before and during the first wave of the COVID-19 crisis and the

2008 global financial crisis. Findings cast light on which countries' and industries' GFDI were most affected by the pandemic crisis and draw a comparison to the global financial crisis. To our surprise, many services industries have shown unexpected resilience of GFDI due to the flexibility for remote work. On the contrary, GFDI in the manufacturing industries, as well as the extractives and the utility industries, has shown a dramatic decline during the pandemic. These contractions raise questions of stability and resilience of the global supply chains these industries are a part of. JEL Codes: F21

Kotikova et al. (2021) analysed the economic impacts of the pandemic COVID-19 with an emphasis on FDI. The paper evaluates the attitudes of governments towards a crisis and the effects on the stages of economic cycle in the Investment Development Path theory. The important role of investment incentives and the role of investment promotion agencies to support businesses in preventing divestment is highlighted. Based on the analysis of UNCTAD, OECD, CZSO and CNB data, the ambition of the paper is to provide a forecast of FDI inflows in the Czech Republic. Three scenarios are created with a prediction of 15%, 37% and 60% of decline in FDI and compared with the pre-pandemic period. The analysis provides recommendations for both private and public sectors. Business production chains should be simplified and the institutional side should support by appropriate incentive programs. Finally, it is essential to put more emphasis on domestic investors.

Hayakawa (2020) empirically examined how the coronavirus disease (COVID-19) has impacted foreign direct investment (FDI), using the quarterly data on bilateral FDI flows from 173 home to 192 host countries from the first quarter of 2019 to the second quarter of 2021. It was measured the severity of COVID-19 damage using three indicators—the number of confirmed cases, the number of deaths, and the stringency index of government policies that restrict people's activities. It was differentiated FDI flows via two different entry modes—Greenfield FDI and cross-border mergers and acquisitions (M&A). Study has found heterogeneous effects of COVID-19 impacts on FDI by sector and entry mode. The severity of COVID-19 in host countries adversely affected FDI in the manufacturing sector regardless of the entry mode, but the effect of home countries' COVID-19 situation on FDI was insignificant. On the other hand, in the service sector, the severity of COVID-19 in both host and home countries has significantly negative impact on greenfield FDI, not on cross-border M&A.

Kalotay (2021) in their study stated the immediate effects of COVID-19 on the global flows of foreign direct investment (FDI) were devastating, resulting in a large drop. Flows to the Visegrad countries were also affected but less than the world average. The fall in FDI was the result of underlying trends that started before the pandemic but accentuated by the latter, creating a “perfect storm”. These secular trends include the digitalisation of production and the birth of Industry 4.0, resulting in more asset-light international production and reorganisations of company networks, the sustainability imperative, making the impact of FDI more relevant than its quantity, and a slowdown in the liberalisation of the policy framework for FDI both in individual countries and at the multilateral level. The recovery of FDI from the shock of 2020 is expected to be long and it will be impossible to return to the pre-pandemic structural and geographical patterns. Building resilience and diversification of production at the expense of the search for the lowest-cost locations will be the top priorities of investors, forcing the host countries to revise their investment promotion strategies focused on cost reduction. In the Visegrad countries, the model based on low labour costs will sooner or later reach its limits.

2.2. Studies on Covid-19 and Employment Ratio

When the sudden lockdown was announced many sectors started shutting down which resulted in loss of employment for many due to which there is bigger effect on the employment ratio. This section has provided various literatures pertains to Covid-19 and employment ratio across the globe.

Antipova (2021) made a study of economic impacts in the context of social disadvantage. It specifically considers economic conditions in regions with pre-existing inequalities and examines labour market outcomes in already socially vulnerable areas. The economic outcomes remain relatively unexplored by the studies on the COVID-19 impacts. To fill the gap, we study the relationship between the pandemic-caused economic recession and vulnerable communities in the unprecedented times. More marginalized regions may have broader economic damages related to the pandemic. First, based on a literature review, delineate areas with high social disadvantage. These areas have multiple factors associated with various dimensions of vulnerability which existed pre-COVID-19. Term these places “*multi-dimensional social disadvantaged areas*”. Second, investigator compare employment and unemployment rates between areas with high and low disadvantage. Integrate geospatial science with the exploration

of social factors associated with disadvantage across counties in Tennessee which is part of coronavirus “red zone” states of the US southern Sunbelt region. It was disagreed with a misleading label of COVID-19 as the “great equalizer”. During COVID-19, marginalized regions experience disproportionate economic impacts. The negative effect of social disadvantage on pandemic-caused economic outcomes is supported by several lines of evidence. Study found that both urban and rural areas may be vulnerable to the broad social and economic damages. The study contributed to current research on economic impacts of the COVID-19 outbreak and social distributions of economic vulnerability. The results can help inform post-COVID recovery interventions strategies to reduce COVID-19-related economic vulnerability burdens.

Unemployment is a serious problem which is being experienced by most of the countries throughout the globe. Unemployment is like a giraffe which is easier to make out than to describe. The crisis of unemployment has been in existence for a long time. Nevertheless, in the developed nations it was experienced in its severe form at the time of the great depression (1930's) while in the developing nations it was after the Second World War (1945). The past few years, there has been a slowdown in the growth of employment in India despite the boost in the economic sector. At the same time due to this COVID-19 pandemic lockdown, there had been a devastating effect on the unemployment rate in India as most of the private companies have fired their employees. The main sufferers of this lockdown are the informal sector employees as the majority of them started losing jobs since construction works were closed. With no capital, thousands of people deserted cities, marching to their homelands for several hundreds of miles away in the absence of government transportation, which showed their intensity of anguish (Ali and Kamaraju 2020).

In a study by Sachdeva et al. (2020) stated that Covid-19 has affected the employment sector all over the world including India. India was already going through a slow economic growth and that was even lowered by the pandemic situation of Covid-19. There is an increase in the level of unemployment and the people were going through huge financial crisis as they are forced to work with salary cuts, many of them have even lost their loss. This long standing economic recession at global and national level is leading the world towards unemployment, under employment and working poverty as well which is declining the population's income and the profit of the enterprises. A sample of 213 people from the different working sectors were surveyed to know the

effect of Covid-19 in the employment in India and also how they are affected by Covid-19. Mean and t test was applied to get the appropriate results. The study concludes that that there is a significant effect of Covid-19 on the employment sector of India.

In the research work of Sirah and Atilaw (2020) mentioned that as COVID-19 epidemic spreads all over, lowest, middle-income and developed countries are competing to respond to this gigantic and fast-moving challenge. Jobs are unable to find and economic recession of the COVID-19 crisis is gradually drumming low income countries more severely. This is a very large negative shock to the economy which is anticipated to knowingly lessen income of households and exaggerate the level of paucity. In developing nations unemployment is getting worse and the severity also higher than developed nation, mainly due to the unbalanced relationship between the rate of economic development and the rapid unemployment growth, in Ethiopia this unbalance also exaggerated with COVID-19 pandemic. High rate of economic growth indicate the need for additional labour market. On the other hand, recession indicates increase the unemployment rates due to lose in job. The study considered a secondary research approach by reviewing research findings that have been strained from scrutinizing the different sentiments, actualities and outcomes from researchers on the topic of impact of COVID-19 on unemployment rate and economic growth. Pointers from the findings are that COVID-19 is a global problem, which affects rich and poor countries. A popular classical theory in economics by John Batiste Say has for a second time futile as witnessed in 1930s due to Great Depression. The study look that supply creates its own demand again invalid due to COVID-19. In Ethiopia, if COVID-19 pandemic is sustained, under unemployment and long run unemployment have a great chance to occur in addition to Keynesian unemployment. The conclusion of the study is that there is direct relationship of COVID-19 pandemic and rise of unemployment rate and reduction of economic growth. Thus the government should give more attention than before to control the pandemic before face huge crisis in the country. Even huge government expenditure should be allocate to fight this pandemic by subsidize all sectors, to increase the hiring capacity of our economy.

Ahmad et al. (2021) stated that Unemployment remains a major cause for both developed and developing nations, due to which they lose their financial and economic impact as a whole. Unemployment rate prediction achieved researcher attention from a fast few years. The study examined the impact of the coronavirus on the unemployment

rate. Accurately predicting the unemployment rate is a stimulating job for policymakers, which plays an imperative role in a country's financial and financial development planning. Classical time series models such as ARIMA models and advanced non-linear time series methods be previously hired for unemployment rate prediction. It is known to us that mostly these data sets are non-linear as well as non-stationary. Consequently, a random error can be produced by a distinct time series prediction model. Research considered hybrid prediction approaches supported by linear and non-linear models to preserve forecast the unemployment rates much precisely. These hybrid approaches of the unemployment rate can advance their estimates by reproducing the unemployment ratio irregularity. These models' appliance is exposed to six unemployment rate statistics sets from Europe's selected countries, specifically France, Spain, Belgium, Turkey, Italy and Germany. Among these hybrid models, the hybrid ARIMA-ARNN forecasting model performed well for France, Belgium, Turkey and Germany, whereas hybrid ARIMA-SVM performed outclass for Spain and Italy. Furthermore, these models are used for the best future prediction. Results show that the unemployment rate will be higher in the coming years, which is the consequence of the coronavirus, and it will take at least 5 years to overcome the impact of COVID-19 in these countries.

The fact that labour in India, in the context of the COVID-19 pandemic, has been trapped in an unprecedented crisis, in living memory, is widely acknowledged. The employment and livelihoods of the overwhelming majority of workers have taken huge hits, and a massive uncertainly continues to loom over their immediate foreseeable future. Article of Jha and Manish (2021) focused on how the world of work in India has been impacted by the pandemic, and it seeks to investigate the ongoing challenges. However, the massive vulnerability of workers in the country, which has been brutally exposed in the current crisis, did not emerge overnight and needs to be situated against the backdrop of the so-called economic reforms, in particular those during the preceding 6 years of the current dispensation at the centre and its (mis)management. The challenges confronting India's working people at the current juncture are enormous, to say the least, but the ruling dispensation, at best, appears to be indifferent to their lives.

Choudary et al. (2020) made a study which focus on assessing the impact on affected sectors, such as aviation, tourism, retail, capital markets, MSMEs, and oil. International and internal mobility is restricted, and the revenues generated by travel and tourism, which contributes 9.2% of the GDP, will take a major toll on the GDP growth

rate. Aviation revenues will come down by USD 1.56 billion. Oil has plummeted to 18-year low of \$ 22 per barrel in March, and Foreign Portfolio Investors (FPIs) have withdrawn huge amounts from India, about USD 571.4 million. While lower oil prices will shrink the current account deficit, reverse capital flows will expand it. Rupee is continuously depreciating. MSMEs will undergo a severe cash crunch. The crisis witnessed a horrifying mass exodus of such floating population of migrants on foot, amidst countrywide lockdown. Their worries primarily were loss of job, daily ration, and absence of a social security net. India must rethink on her development paradigm and make it more inclusive. COVID 19 has also provided some unique opportunities to India. There is an opportunity to participate in global supply chains, multinationals are losing trust in China. To 'Make in India', some reforms are needed, labour reforms being one of them.

2.3. Studies on Covid-19 Gross Domestic Product Constant

Mou (2020) stated that with the development of cosmopolitanization and globalization, dense population and large-scale population flow not only make the economy more integrated, but also make the spread of the plague more rapidly. The impact is unprecedented. The outbreak of COVID-19 has disrupted the Chinese economy and is spreading globally. The evolution of the disease and its economic impact is highly uncertain. Because of its high infectivity, high mortality and incubation period, the main preventive measures are to control social distance and isolation, which makes many economic activities impossible. Global GDP will fall by as much as 3%, while developing countries will be the hardest hit, as much as 4% on average, but some were more than 6.5% and world merchandise trade will plummet by 13% in 2020 due to the COVID-19 pandemic. This paper analyse the macro economic impact of new coronavirus on the world GDP, merchandise trade (taking China as an example with other countries), and various industries, and proposes some counter measures.

COVID-19 has affected all countries globally. Pardhan and Drydakis (2021)¹ explored associations between the change in new COVID-19 registered cases per million population and various macroeconomic and well-being indicators in 38 European countries over a 2-month period (1st April-31st May 2020). A statistically significant ($p = 0.002$) negative association was estimated between the change in new COVID-19

cases and GDP per capita, after controlling for key health determinants including public expenditure on health, life expectancy, smoking tobacco and sanitation. The country with the highest GDP per capita in Europe (i.e., Luxemburg) was found to experience the lowest change in new COVID-19 cases within the time period whilst the opposite was found for countries with lower GDP per capita (i.e., Ukraine, Bulgaria, and Romania). The outcomes of this study indicate that, in the first wave of the pandemic in Europe, a country's GDP per capita might be associated with a lower rate of new COVID-19 cases. The study concludes by suggesting that in European regions a country's economic performance should be a critical health priority for policy makers.

The virus that triggered a localized shock in China is now delivering a significant global shock. This Malisiwizka (2020) studied the potential impact of COVID-19 on gross domestic product and trade, using a standard global computable general equilibrium model. It models the shock as underutilization of labour and capital, an increase in international trade costs, a drop in travel services, and a redirection of demand away from activities that require proximity between people. A baseline global pandemic scenario sees gross domestic product fall by 2 percent below the benchmark for the world, 2.5 percent for developing countries, and 1.8 percent for industrial countries. The declines are nearly 4 percent below the benchmark for the world, in an amplified pandemic scenario in which containment is assumed to take longer and which now seems more likely. The biggest negative shock is recorded in the output of domestic services affected by the pandemic, as well as in traded tourist services. Since the model does not capture fully the social isolation induced independent contraction in demand and the decline in investor confidence, the eventual economic impact may be different. This exercise is illustrative, because it is still too early to make an informed assessment of the full impact of the pandemic. But it does convey the likely extent of impending global economic pain, especially for developing countries and their potential need for assistance.

Inou et al. (2021) examined how the economic effects of lockdowns in different regions interact through supply chains, which are a network of firms for production, by simulating an agent-based model of production using supply-chain data for 1.6 million firms in Japan. We further investigate how the complex network structure affects the interactions between lockdown regions, emphasising the role of upstream ness and loops by decomposing supply-chain flows into potential and circular flow components. We

find that a region's upstreamness, intensity of loops, and supplier substitutability in supply chains with other regions largely determine the economic effect of the lockdown in the region. In particular, when a region lifts its lockdown, its economic recovery substantially varies depending on whether it lifts the lockdown alone or together with another region closely linked through supply chains. These results indicate that the economic effect produced by exogenous shocks in a region can affect other regions and therefore this study proposes the need for inter-region policy coordination to reduce economic loss due to lockdowns.

Kolachi et al. (2021) stated that as the world becomes more interconnected, the economic impacts of the pandemic become more serious. In addition to increased health expenditures and reduced labour force, the pandemic has hit the supply and demand chain massively and caused trouble for manufacturers who have to fire some of their employees or delay their economic activities to prevent more loss. With the closure of manufacturers and companies and reduced travel rates, usage of oil after the beginning of the pandemic has decreased significantly that was unprecedented in the last 30 years. The mining industry is a critical sector in several developing countries, and the COVID-19 pandemic has hit this industry too. Also, world stock markets declined as investors started to become concerned about the economic impacts of the COVID-19 pandemic. The tourism industry and airlines have also experienced an enormous loss too. The GDP has reduced, and this pandemic will cost the world more than 2 trillion at the end of 2020.

Chatterjee et al. (2020) stated that the number of reported cases in India has been scaling up in geometric progression despite the stringent lockdown norms imposed to keep people indoors since late March. Interestingly, on 31st March there were 1117 affected cases, 33610 on 30th April and 78003 till May 14 an unprecedented rise in the numbers. Historical records are suggestive of the fact that no such lockdown measures were implemented for pandemics which had destroyed human lives and had long lasting effects over a period of time. This makes the case of COVID-19 more interesting. This lockdown measure is being implemented across the globe, India being no exception, has two-fold effects, viz., first, in terms of slowing down the economy and second, as a preventive measure to control the spread of COVID-19. In the present research article, it is proposed a differential equation based mathematical model for modeling India's COVID-19 that incorporates the lockdown effect while looking at the future predictions

in terms of the spread and the extent to which lockdown has been effective in India. Researchers have estimated the growth of COVID-19 across India using modified SIR modelling, which is a Compartmental model in Epidemiology. Further, use of SIQR model to estimate the growth of this disease across the country. Also, a constant factor has been introduced in the model to measure the number of corona affected patients count due to any accidental mass crowd gathering. The novelty in the paper is the comparative study of the models under two scenarios viz., what could have been the figure without lockdown and social distancing and with lockdown and social distancing. Simultaneously, this is correlated with the predictions for fall in the level of GDP growth (under case based scenarios of comparative growth rates with and without fiscal stimulus that government introduces). Our model predicts that not only will the lockdown to a certain extent control the spread of coronavirus in future but also will exacerbate the size of the recession caused by the epidemic. The paper concluded by suggesting some broadly defined strategies in line with reaching the optimum trade-off between saving lives and saving the economy and how to get the economy back on track backed by proper implementation and monitoring.

2.4. Other Covid-19 Related Studies

Baidhani (2020) stated that although some countries around the world already started recovering from the COVID-19 pandemic, it is worth mentioning, as predicted by the World Bank's respective modelling, that the full recovery may not take place before the year 2025 for some of the world's regions. Consequently, it should be recognized that the world was, is, and will continue for quite some time, to be in a COVID-19 major recession, the worst global economic crisis since the US Great Depression. As of today, September 26, 2020 and in light of the aforementioned, especially the World Bank's modelling, all developed and developing economies are in either economic recession or even economic depression. It is noticeable that the pandemic hit almost every part of the world, reaching to almost all industries and economic areas. However, the economic effect resulted of the pandemic varies from industry to another and from country to another, depending on the resilience of the respective country, its economy, and/or its relevant industry. Economic growth has been declined in all the sample countries and GDP% change in 2020 are shown as GDP contractions in all of these countries though with different percentages.

In a study by Alquachi et al. (2021) stated that Since the COVID-19 diagnosed as a pandemic, it has spread to over 200 countries and all U.S. states. The pandemic is negatively effecting global economic growth beyond anything experienced in nearly a century. Estimates so far indicate the virus could trim global economic growth by %3 to % 6 in 2020. The economic fallout from the pandemic raises the risks of a global economic recession with levels of unemployment not experienced since the Great Depression of the 1930s. The human costs in terms of lives lost will permanently effect global economic growth in addition to the cost of rising levels of poverty, lives upended, careers derailed, and increased social unrest. Global trade could also fall by 13% to 32%, depending on the depth and extent of the global economic downturn, exacting an especially heavy economic toll on trade-dependent developing and emerging economies. The full impact will not be known until the effects of the pandemic peak.

Anne Green et al. (2020) stated that a shift to remote worked raised important issues about the changed geography of work and the associated implications for places. It seems unlikely that a 'new normal' after the COVID-19 pandemic will replicate the pre-COVID-19 picture. This had implications for the geography of work, both directly and indirectly because remote worked in some jobs had implications for the sustainability of other jobs previously reliant on them. This chapter traces the possible short- and medium-term implications for places of remote worked, addressed important questions related to (1) the changed attractiveness of places in the context of greater remote worked (2) the future for city (3) a possible revival of outer urban centres, market towns, and rural areas (4) implications for geographical segregation and inequalities as different sub-groups face different possibilities for remote worked; and (5) the implications of remote worked for place-based policy.

Boneva et al. (2020) presented the real time survey evidence from the UK, US and Germany showed that the labour market impacts of COVID-19 differ considerably across countries. The study also focused the employees in Germany, which had a well-established short-time work scheme were substantially less likely to be affected by the crisis. Within countries the impacts were highly unequal Workers in alternative work arrangements and in occupations in which only a small share of tasks could be done from home were more likely to have reduced their hours, lost their jobs and suffered falls in earned. And concluded less educated workers and women are more affected by the crisis.

Maliszewska (2020) reported that the virus that triggered a localized shock in China is now delivering a significant global shock. This study simulates the potential impact of COVID-19 on gross domestic product and trade, using a standard global computable general equilibrium model. It models the shock as underutilization of labor and capital, an increase in international trade costs, a drop in travel services, and a redirection of demand away from activities that require proximity between people. A baseline global pandemic scenario sees gross domestic product fall by 2 percent below the benchmark for the world, 2.5 percent for developing countries, and 1.8 percent for industrial countries. The declines are nearly 4 percent below the benchmark for the world, in an amplified pandemic scenario in which containment is assumed to take longer and which now seems more likely. The biggest negative shock is recorded in the output of domestic services affected by the pandemic, as well as in traded tourist services. Since the model does not capture fully the social isolation induced independent contraction in demand and the decline in investor confidence, the eventual economic impact may be different.

Mukunoki (2021) investigated the impacts of COVID-19 on global value chains by examining bilateral trade in finished machinery products from January to June in both 2019 and 2020. The numbers of COVID-19 cases and deaths as measures of the impact of the pandemic. Specifically, these impacts affected value chains in three scenarios—countries that import finished machinery products, countries that export finished machinery products, and countries that export machinery parts to countries exporting finished machinery products—to assess the impacts on demand, output, and supply chain, respectively. In our analysis, the largest negative impacts were from supply chain effects, followed by output effects. In contrast, study did not find significant impacts from demand effects. We also found that output effects are not so strong in intra-Asian trade compared with trade in other regions.

Wang et al. (2022) reported COVID-19 deaths between Jan 1, 2020, and Dec 31, 2021, totalled 5.94 million worldwide. It was estimated that 18.2 million (95% uncertainty interval 17.1–19.6) people died worldwide because of the COVID-19 pandemic (as measured by excess mortality) over that period. The global all-age rate of excess mortality due to the COVID-19 pandemic was 120.3 deaths (113.1–129.3) per 100 000 of the population, and excess mortality rate exceeded 300 deaths per 100 000 of the population in 21 countries. The number of excess deaths due to COVID-19 was

largest in the regions of south Asia, north Africa and the Middle East, and eastern Europe. At the country level, the highest numbers of cumulative excess deaths due to COVID-19 were estimated in India (4.07 million [3.71–4.36]), the USA (1.13 million [1.08–1.18]), Russia (1.07 million [1.06–1.08]), Mexico (798 000 [741 000–867 000]), Brazil (792 000 [730 000–847 000]), Indonesia (736 000 [594 000–955 000]), and Pakistan (664 000 [498 000–847 000]). Among these countries, the excess mortality rate was highest in Russia (374.6 deaths [369.7–378.4] per 100 000) and Mexico (325.1 [301.6–353.3] per 100 000), and was similar in Brazil (186.9 [172.2–199.8] per 100 000) and the USA (179.3 [170.7–187.5] per 100 000).

Gulmoto (2020) assembled four independent population samples to model and estimate the level of Covid-19 mortality in India. Population sample with the age and sex of Covid-19 victims was used to develop a Gompertz model of Covid-19 mortality in India. It was applied and adjusted this mortality model on two other national population samples after factoring in the demographic characteristics of these samples. It was derived from these samples, the most reasonable estimate of Covid-19 mortality level in India and confirm this result using a fourth population sample. Our findings point to a death toll of about 3.2–3.7 million persons by late May 2021. This is by far the largest number of Covid-19 deaths in the world. Once standardized for age and sex structure, India's Covid-19 mortality rate is above Brazil and the USA. Our analysis shows that existing population samples allow an alternative estimation of deaths due to Covid-19 in India. The results imply that only one out of 7–8 deaths appear to have been recorded as a Covid-19 death in India. The estimates also point to a very high Covid-19 mortality rate, which is even higher after age and sex standardization. The magnitude of the pandemic in India requires immediate attention. In the absence of effective remedies, this calls for a strong response based on a combination of non-pharmaceutical interventions and the scale-up of vaccination to make them accessible to all, with an improved surveillance system to monitor the progression of the pandemic and its spread across India's regions and social groups.

CHAPTER - 3

METHODOLOGY

Methodology pertaining to the study on “**Relationship between Gross Domestic product, Employment, Foreign Direct Investment and COVID-19 among World Countries – A Comparative study between Pre and Post COVID Period**” was analysed under the following heads

3.1. Selection of the Problem

3.2. Selection of the Countries, Collection of Data and Period of the Study

3.3. Specification of Econometric Models and Estimation Issues

3.4. Definition of the Terms used in the Study

3.5. Limitations of the Study

3.1. Selection of the Problem

The Coronavirus Disease 19 (COVID-19) was declared as a global health emergency by .The World Health Organization (WHO) on March 12th 2020. The World Health Organisation reported 157,847 COVID-19 confirmed deaths and 2,314,621 COVID 19 confirmed cases at the world level as on April 20th 2020. As the epicentre of the pandemic, China was the first country to completely shut-down commercial activities, restrict domestic and international travel and impose a containment system on the population. Following that, similar policy measures were adopted by numerous countries. The containment measures such as closing of schools, colleges and universities; shutting down non-essential companies and sending workers home, restriction of public transport operations; forbidding gatherings and meetings in public spaces; requiring individuals to remain in their residence, aside from going out for Necessities . This state of sanitary emergency was not without major consequences. It was expected to seriously impact the world economy.

One of the negative Impact experienced by the world countries due to COVID was Trade and Development. In the year, 2020, there was a largest reduction in trade and output volumes. The foreign direct investment and employment had also declined in the post pandemic period. The world trade experienced a setback as that of Global Financial Crisis. In 2020, trade in services declined more and has been recovering at a slower pace than goods trade. Not surprisingly, trade in travel and tourism services

slumped dramatically but trade in digitally delivered services, such as telecommunication and information technology services, boomed. Overall, the value of exports of services in OECD countries declined in 2020 by -16.7%, twice as much as the value of goods exports, which dropped by -8.2%. This was also one factor underpinning the comparatively large adjustments in output relative to those in trade, as services account for a larger share of the economy than their weight in international trade (World Trade Organisation, 2020).

In this back drop, an attempt was made to analyse the **“Relationship between the Gross Domestic product, Employment, Foreign Direct Investment and COVID-19 among World Countries”**

3.2. Selection of the Countries, Collection of Data and Period of the Study

Selection of countries

In the present study, the world countries such as Afghanistan, Bangladesh, Burkina Faso, Burundi, Central African Republic, Chad, Colombia, Congo, Dem. Rep., Eritrea, Ethiopia, Guinea, Haiti, Kenya, Kyrgyz Republic, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sierra Leone, Somalia, South Sudan, Syrian Arab Republic, Tajikistan, Tanzania, Togo, Uganda, Zimbabwe, Armenia, Bolivia, Cameroon, Congo, Rep., Cote d'Ivoire, Egypt, Arab Rep., El Salvador, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Lao PDR, Mauritania, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Senegal, Sri Lanka, Sudan, Syrian Arab Republic, Ukraine, Uzbekistan, Vietnam, West Bank and Gaza, Yemen, Rep., Albania, Algeria, Angola, Argentina, Azerbaijan, Belarus, Bosnia and Herzegovina, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Hungary, Iran, Islamic Rep, Iraq, Japan, Kazakhstan, Lebanon, Libya, Malaysia, Mexico, Panama, Peru, Romania, Serbia, South Africa, Thailand, Tunisia, Turkey, Turkmenistan, Venezuela, RB, Australia, Austria, Belgium, Canada, Chile, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, China, Ireland, Israel, Italy, Japan, Korea, Rep. Lithuania, Netherlands, New Caledonia, New Zealand, Norway, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States, Uruguay were affected by COVID -19. Therefore the above countries were included in the study on

“Relationship between the Gross Domestic product, Employment, Foreign Direct Investment, and COVID-19 among World Countries”.

Collection of Data and Period of Study

The data for the study was secondary in nature. The empirical data on the gross domestic product, world imports, world exports were collected from the following secondary sources

1. World meter -2021
2. World bank data – 2020-2021
3. World Health Organisation Data base, 2021

To analyse the effect of COVID -19 on imports and exports, the period 2018 was considered as pre COVID period and the period 2019 -2020 was considered post COVID period. Therefore, the study period was confined to the period of 2018 -2020.

3.4. Specification of Econometric Models and Estimation Issues

In the current study, the paired sample t test multiple linear regression analysis and path model were used to assess the relationship between foreign direct investment, employment and gross domestic product among the world countries. In the present study, the path analysis was used along with t test and multiple linear regression analysis to fulfil the objectives of the study. The following econometric models were specified to fulfil the objectives of the study.

t test

Paired sample t test was used to compare the foreign direct investment, employment and gross domestic product, COVID cases and gross domestic product before and after COVID period. The formula for estimating the paired sample t test was

$$t = \frac{\bar{d}}{\sqrt{s^2/n}}$$

Where

d = Mean difference of variable between pre and post COVID period

s = Sample variance

n = Sample Size

Regression Analysis

To analyse the relationship between foreign direct investment, employment and COVID cases and gross domestic product, regression analysis was carried out. Separate regression equations were specified to analyse the relationship between foreign direct investment, employment, COVID -19 cases and gross domestic product for least developed countries, developing countries and developed countries.

Gross Domestic Product Equation in the Least Developed Countries

The form of the regression equation specified to assess the relationship between gross domestic product, employment, COVID cases and gross domestic product in the least developed countries was

$$Y_1 = b_0 + b_1 X_1 + b_2 X_2 + U$$

Where Y_1 = Gross Domestic Product in the least developed countries (billion\$), X_1 = Foreign direct investment inflow (as a percentage of gross domestic product), Foreign direct investment outflow (\$ billion), Employment (as a percentage of gross domestic product), COVID 19 Cases and death under COVID (number) = error term

Gross Domestic Product Equation in Developing Countries

The form of the regression equation specified to assess the relationship between the foreign direct investment, employment, COVID cases and gross domestic product in the developed countries was

$$Y_2 = b_0 + b_1 X_1 + b_2 X_2 + U$$

Where Y_1 = Gross Domestic Product in the least developed countries (billion\$), X_1 = Foreign direct investment inflow (as a percentage of gross domestic product), Foreign direct investment outflow (\$ billion), Employment (as a percentage of gross domestic product), COVID 19 cases and death under COVID (number) = error term

Gross Domestic Product Equation in Developed Countries

The form of the regression equation specified to assess the relationship between the foreign direct investment, employment, COVID cases and gross domestic product in the developed countries was

$$Y_2 = b_0 + b_1 X_1 + b_2 X_2 + U$$

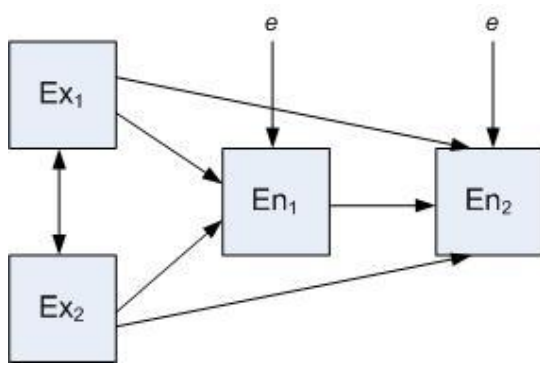
Where Y_2 = Gross Domestic Product in the least developed countries (billion\$),
 X_i =Foreign direct investment inflow (as a percentage of gross domestic product),
Foreign direct investment outflow (\$ billion), Employment (as a percentage of gross
domestic product), COVID 19 cases and death under COVID (number) = error term

Path Analysis

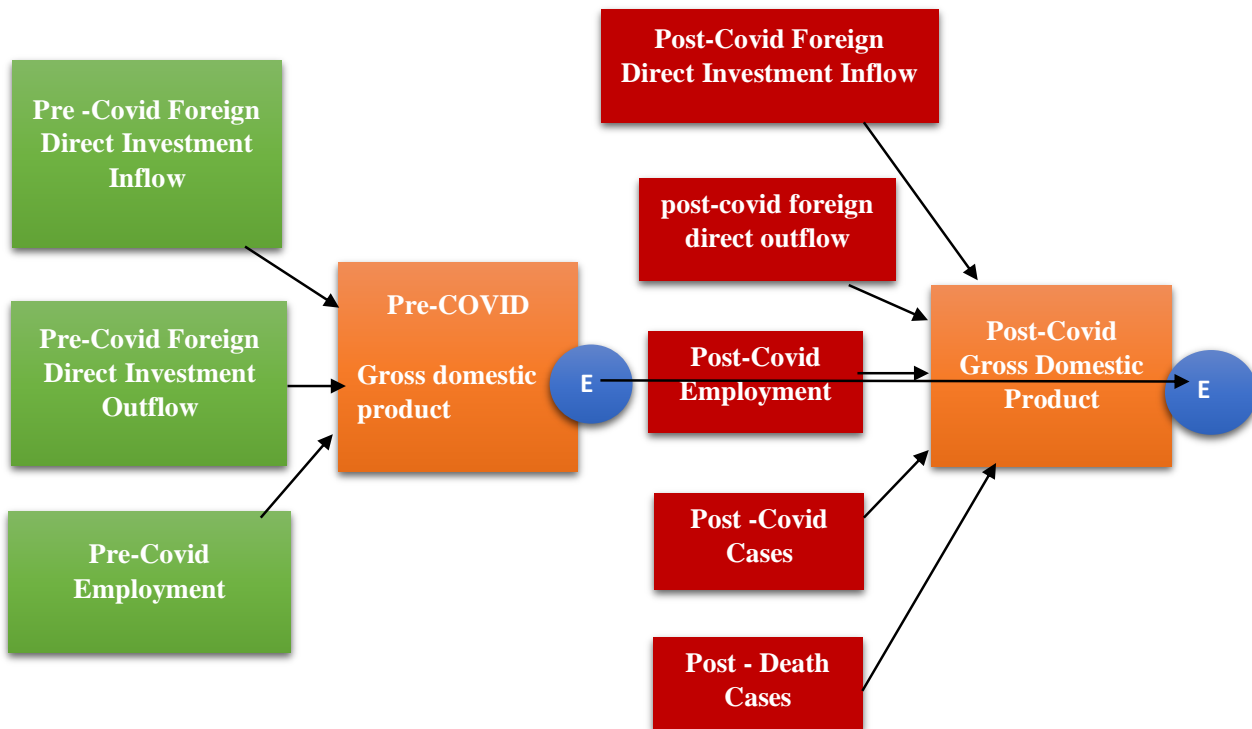
Path analysis is a statistical technique that allows users to investigate patterns of effect within a system of variables. It is one of several types of the general linear model that examine the impact of a set of predictor variables on multiple dependent variables. Path analysis is similar to multiple regression in that the effect of multiple predictors on a criterion variable can be assessed. It differs from multiple regression, however, in that two or more criterion variables can be examined at the same time. In the present study, path analysis was performed for testing the casual relationship among the selected variables.

Variables that are independent variables, and not dependent variables, are called 'exogenous'. Graphically, these exogenous variable boxes lie at outside edges of the model and have only single-headed arrows exiting from them. No single-headed arrows point at exogenous variables. Variables that are solely dependent variables, or are both independent and dependent variables, are termed 'endogenous'. Graphically, endogenous variables have at least one single-headed arrow pointing at them.

In the model below, the two exogenous variables (Ex_1 and Ex_2) are modelled as being correlated as depicted by the double-headed arrow. Both of these variables have direct and indirect (through En_1) effects on En_2 (the two dependent or 'endogenous' variables/factors). In most real-world models, the endogenous variables may also be affected by variables and factors stemming from outside the model (external effects including measurement error). These effects are depicted by the "e" or error terms in the model.



Using the same variables, alternative models are conceivable. For example, it may be hypothesized that Ex_1 has only an indirect effect on En_2 , deleting the arrow from Ex_1 to En_2 ; and the likelihood or 'fit' of these two models can be compared statistically.



In the current study, the following path model was used to assess the interrelationship between the foreign direct investment, employment, gross domestic product and COVID cases before and after COVID pandemic.

3.4. Definition of the Terms Used in the Study

1. COVID-19 cases and deaths

The COVID -19 Cases and Death reported by the World Health Organisation were considered as the COVID -19 affected cases and death under COVID -19, in the present study.

2. Foreign direct investment

A foreign direct investment (FDI) is a purchase of an interest in a company by a company or an investor located outside its borders. Generally, the term is used to describe a business decision to acquire a substantial stake in a foreign business or to buy it outright in order to expand its operations to a new region. It is not usually used to describe a stock investment in a foreign company.

3. Employment Ratio

Employment ratio is defined as the ratio of number of persons employed to gross domestic product among the world countries.

4. Gross Domestic Product

Gross domestic product (GDP) is a monetary measure of the market value of all the final goods and services produced in a specific time period by countries.

5. Developing Countries

The countries such as Armenia, Bolivia, Cameroon, Congo Rep., Cote d Ivoire, Egypt, Arab Rep., EI Salvador, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Lao PDR, Mauritania, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Senegal, Sri Lanka, Sudan, Syrian Arab Republic, Ukraine, Uzbekistan, Vietnam, West Bank and Gaza and Yemen, Rep. were classified as developing countries in the world bank report, 2018. In the present study, the above countries were classified as the developing countries.

6. Developed Countries

The countries such as Albania, Algeria, Angola , Argentina , Azerbaijan , Belarus , Bosnia and Herzegovina , Brazil , Bulgaria , China , Colombia Costa Rica, Dominican Republic, Ecuador, Hungary, Iran ,Islamic Rep, Iraq, Japan, Kazakhstan, Lebanon, Libya, Malaysia, Mexico, Panama, Peru, Romania, Serbia, South Africa, Thailand,

Tunisia, Turkey, Turkmenistan, Venezuela, RB were classified as developed countries in the world bank report, 2018. In the present study, the above countries were classified as the Developed Countries.

7. Least Developed Countries

The countries such as Afghanistan , Bangladesh, Burkina Faso , Burundi , Central African Republic , Chad , Colombia , Congo, Dem. Rep., Eritrea , Ethiopia ,Guinea, Haiti, Kenya, Kyrgyz Republic, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sierra Leone, Somalia, South Sudan, Syrian Arab Republic, Tajikistan, Tanzania, Togo and Uganda were classified as the least developed countries in the world bank report, 2018. In the present study, the above countries were considered as the least developed countries

3.5. Limitations of the Study

1. The Determinants of foreign direct investment and employment were not analysed in the present study
2. The effect of COVID 19 on development was analysed and the other factors which are assumed to be constant.
3. The long period analysis of interrelationship between foreign direct investment, employment and gross domestic product was not undertaken which may reveal more policy implications.
4. In the present Study, determinants of COVID -19 cases and death were not analysed.

CHAPTER - 4

RESULT AND DISCUSSION

In this chapter, the investigator has brought up the results and discussion for the study on **“Relationship between Gross Domestic Product, Employment, Foreign Direct Investment and Covid-19 Among World Countries – A Comparative Study Between Pre and Post Covid Period”** under the following heads:

- 4.1. Foreign Direct Investment Inflow among World Countries
- 4.2. Foreign Direct Investment Outflow among World Countries
- 4.3. Employment Ratio among World Countries
- 4.4. Gross Domestic Product among World Countries
- 4.5. Covid-19 Cases and Death Cases under Covid-19 Among World Countries
- 4.6. Comparison of Foreign Direct Investment Inflow, Outflow, Employment, Gross Domestic Product, Covid 19 Cases and Death under Covid-19 – ‘t’ Test
- 4.7. Relationship between of Foreign Direct Investment Inflow, Outflow, Employment, Gross Domestic Product- Simple Linear Regression
- 4.8. Interrelationship between Foreign Direct Investment Inflow, Outflow, Employment and Gross Domestic Product –Path Analysis
- 4.9. Interrelationship Foreign Direct Investment Inflow, Outflow, Employment, Gross Domestic Product.
- 4.10. Interrelationship between Foreign Direct Investment Inflow outflow, Employment and Gross Domestic Product –Direct Relationship
- 4.11. Interrelationship between foreign direct investment inflow, outflow, employment and gross domestic product –indirect relationship
- 4.12. Interrelationship between Foreign Direct Investment Inflow Outflow, Employment and Gross Domestic Product –Total Effects

4.1 Foreign Direct Investment Inflow among World Countries

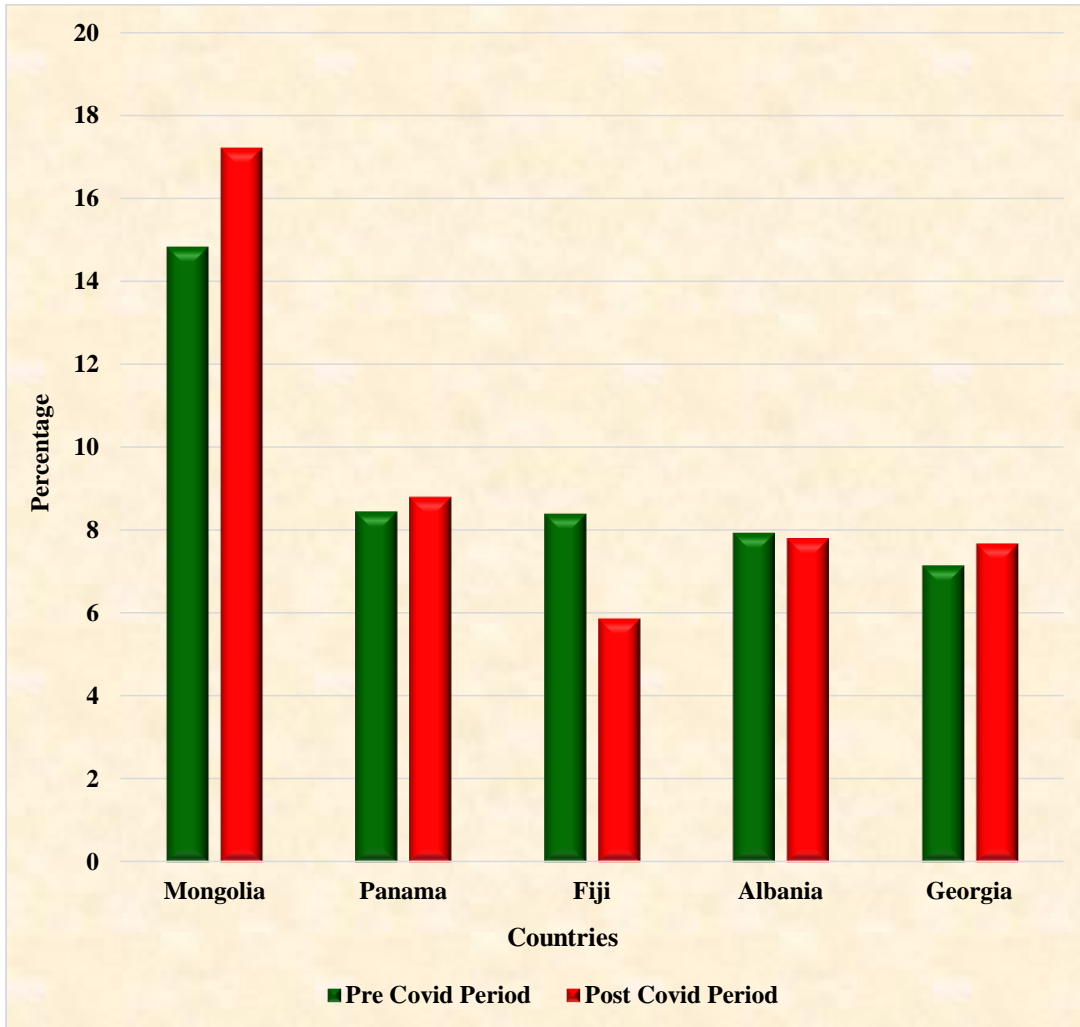
Global Gross Domestic Product is anticipated to decelerate sharply as Corona Virus-Weary countries reach the third year of the pandemic. Against this bleak backdrop, emerging market and developing economies (EMDEs) face a slew of economic issues, including ongoing COVID-19 outbreaks, high inflation, record debt levels and expanding income inequality. The current study attempted to analyze the FDI inflow, outflow, employment ratio, GDP and Covid-19 cases among developing countries.

**Table 1: Foreign Direct Investment Inflow in Developing Countries
(Percentage of Gross Domestic Product)**

Sl. No.	Countries	Pre covid Period	Post Covid Period
1	Albania	7.946351351	7.798722164
2	Algeria	0.83820748	0.804110687
3	Argentina	2.232532213	1.474349429
4	Armenia	2.141806067	0.74119924
5	Azerbaijan	2.977946112	3.121830561
6	Belarus	2.376261878	1.976877774
7	Belize	6.369938959	4.736916189
8	Bolivia	0.750524781	0.529735011
9	Bosnia and Herzegovina	2.982460764	2.166756577
10	Botswana	1.690616757	0.564111762
11	Brazil	4.077487084	3.683753199
12	Bulgaria	2.727195092	3.012025634
13	China	1.693905294	1.310718781
14	Colombia	3.380835767	4.325462724
15	Costa Rica	4.829438713	4.243654592
16	Croatia	1.948281054	1.879716587
17	Dominican Republic	3.207863799	3.180974427
18	El Salvador	1.586204787	2.588749059
19	Fiji	8.400461673	5.863669962
20	Georgia	7.157546395	7.673532126
21	Ghana	4.441407055	5.677452823
22	Guatemala	1.259958631	1.518212035
23	Honduras	6.035820524	3.833334359
24	India	1.559263523	1.763127508
25	Indonesia	1.814289797	2.23337923
26	Iraq	2.148548348	1.308224952
27	Jamaica	4.924230845	4.203305436
28	Kazakhstan	0.046508909	1.827872727

Sl. No.	Countries	Pre covid Period	Post Covid Period
29	Korea, Rep.	0.706300894	0.583393861
30	Kyrgyz Republic	1.743691279	3.143481911
31	Malaysia	2.31456942	2.506300607
32	Mexico	3.083046636	2.316032682
33	Moldova	2.519829308	4.190477835
34	Mongolia	14.80888001	17.19893953
35	Morocco	3.001270496	1.435570784
36	Namibia	1.712992678	1.412189678
37	Nicaragua	6.430591725	3.988512251
38	Nigeria	0.195182773	0.514392932
39	Pakistan	0.55218666	0.800554414
40	Panama	8.451112137	8.795068252
41	Paraguay	0.818799599	1.57289966
42	Philippines	2.868336627	2.301175741
43	Romania	3.041348095	2.947572771
44	Russian Federation	0.530060761	1.894858985
45	Saudi Arabia	0.539985957	0.575380136
46	South Africa	1.37571219	1.318804454
47	Sri Lanka	1.834911534	0.885174246
48	Suriname	3.277093148	2.112202454
49	Tajikistan	2.844324817	2.56373023
50	Thailand	2.60285045	0.884981782
51	Tonga	4.069875401	0.340082735
52	Trinidad and Tobago	2.956875325	0.792701554
53	Turkey	1.647072935	1.217601329
54	Ukraine	3.496037359	3.790542608
55	Uzbekistan	1.186869129	3.866754969
56	Vanuatu	4.108704685	2.869400105
57	Vietnam	6.321017489	6.154521757

Source: World Bank Report



Source: World Bank Report 2020

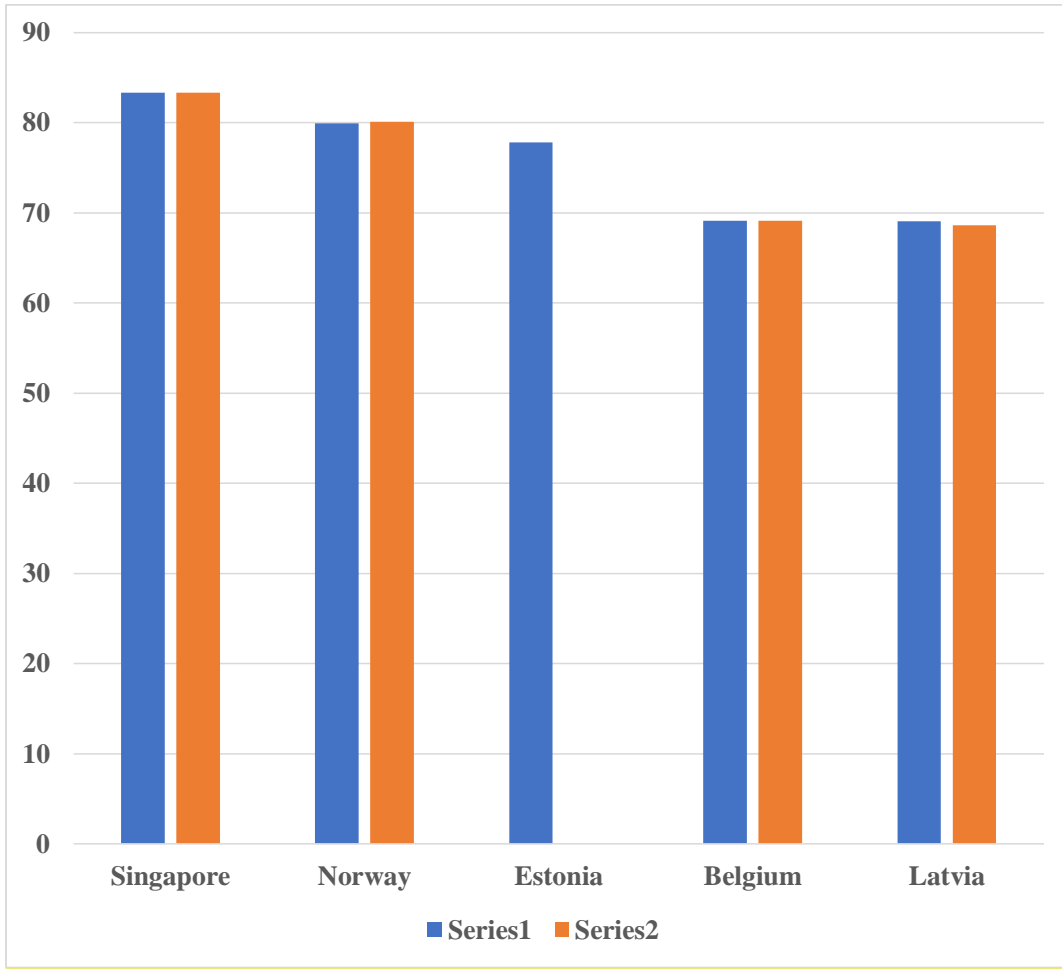
Figure 1: Top 5 Developing Countries in FDI Inflow(%)

The table shows that Mongolia experienced high FDI inflows in both before and after Covid, with FDI inflows of 14.8089 percent in 2018 and 17.1989 percent in 2019. The next contributor country is Panama, which has had moderate growth in FDI inflows, with an inflow of 8.4511percent in 2018 and an increase to 8.7951 percent.

Table 2: Foreign Direct Investment Inflow in Developed Countries
(Percentage of Gross Domestic Product)

Sl. No	Countries	Pre Covid- Period	Post Covid- Period
1	Australia	4.306995387	2.887816379
2	Austria	-6.27662398	-1.820238125
3	Belgium	-7.661277369	-5.618551633
4	Canada	2.506586797	2.588902574
5	Chile	2.607656422	4.505104336
6	Cyprus	-24.89880142	100.6677833
7	Czech Republic	3.343910398	4.258298877
8	Denmark	2.456000967	-1.012727762
9	Estonia	4.044477716	9.866417057
10	Finland	-3.83615706	5.808291174
11	France	2.777934684	2.106467776
12	Germany	3.987458986	1.739025569
13	Iceland	-2.370719438	-2.413874415
14	Japan	0.502082815	0.775579007
15	Latvia	1.243184753	3.169965191
16	Malta	30.09701982	27.96295579
17	Netherlands	-37.73082444	-18.60015975
18	New Zealand	1.231793096	1.382531448
19	Norway	-1.296183832	4.206060274
20	Poland	3.000280492	2.410759842
21	Portugal	3.239576964	4.300252034
22	Singapore	22.10501951	32.16983711
23	Sweden	-0.171454534	3.181697718
24	Switzerland	-19.9852542	5.099067078
25	United Kingdom	2.797819539	0.077698118
26	United States	1.039765408	1.409955825
27	Uruguay	2.747957941	2.13494686

Source: World Bank Report 2020



Source: World Bank Report

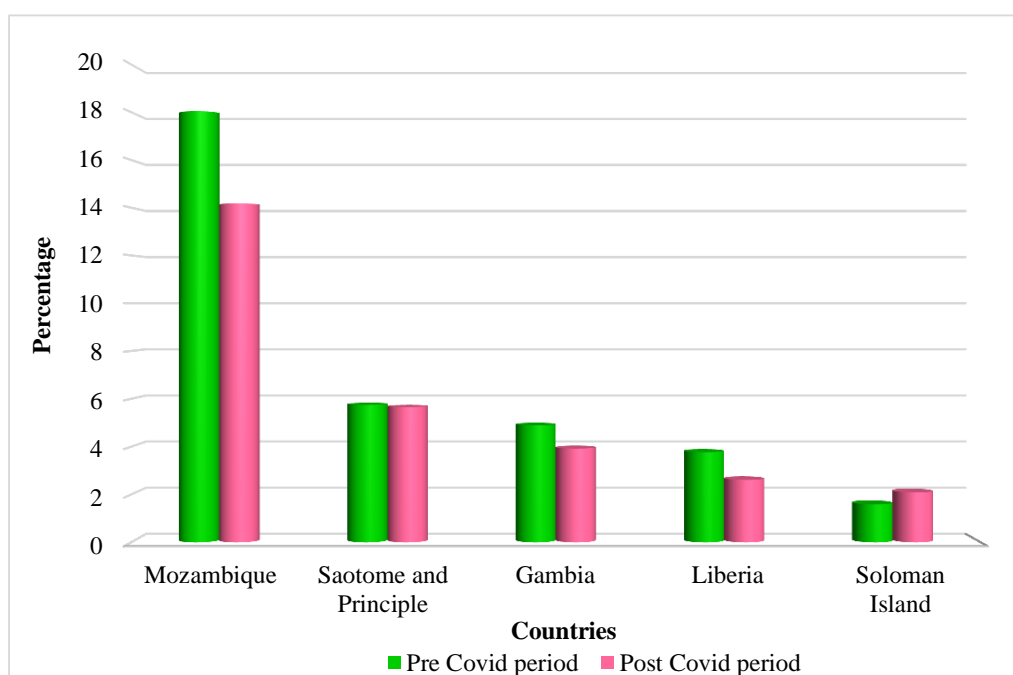
Figure 2: Top 5 Countries Foreign Direct Investment Inflow in Developed Countries (%)

The table shows that Malta experienced high FDI inflows in both before and after Covid period, with FDI inflows of 30.09701982 in 2018 and 17.19893953 in 2019. The next contributor country is Singapore, which has had moderate growth in FDI inflows, with an inflow of in 22.10501951 2018 and an increase to in 32.16983711 2019.

**Table 3: Foreign Direct Investment Inflow in Less Developed Countries
(Percentage of GDP)**

Sl. No.	Countries	Pre Covid-Period	Post Covid Period
1	Afghanistan	0.661572002	0.124495944
2	Angola	-6.36987727	-4.58354678
3	Bangladesh	0.883679503	0.883679503
6	Gambia	4.89653695	3.92177459
7	Liberia	3.772684939	2.611211949
8	Mozambique	18.03997027	14.17491392
9	Sao tome and principle	5.748478468	5.659892909
10	Solo man islands	1.587231963	2.088225852
11	Zambia	1.552313969	2.350919043

Source: World Bank Report, 2020



Source: World Bank Report 2020

Figure 3: Top 5 Countries Foreign Direct Investment in Less Developed Country(%)

The table shows that the inflow of foreign direct investment was higher in Mozambique. In the pre COVID period, the inflow of foreign direct investment was \$ 18.03997027 in 2018 which declined to 14.17491392 in 2019. This was followed by the next important country, Sao tome and principle. In the pre COVID period, it was.748478468 in 2018 and in the post COVID period, it was 5.659892909 in 2019. In the post COVID period, it was 5.659892909 in 2019.

4.2 Foreign Direct Investment Outflow in World Countries

Table 4: Foreign Direct Investment Outflow In Developing Countries

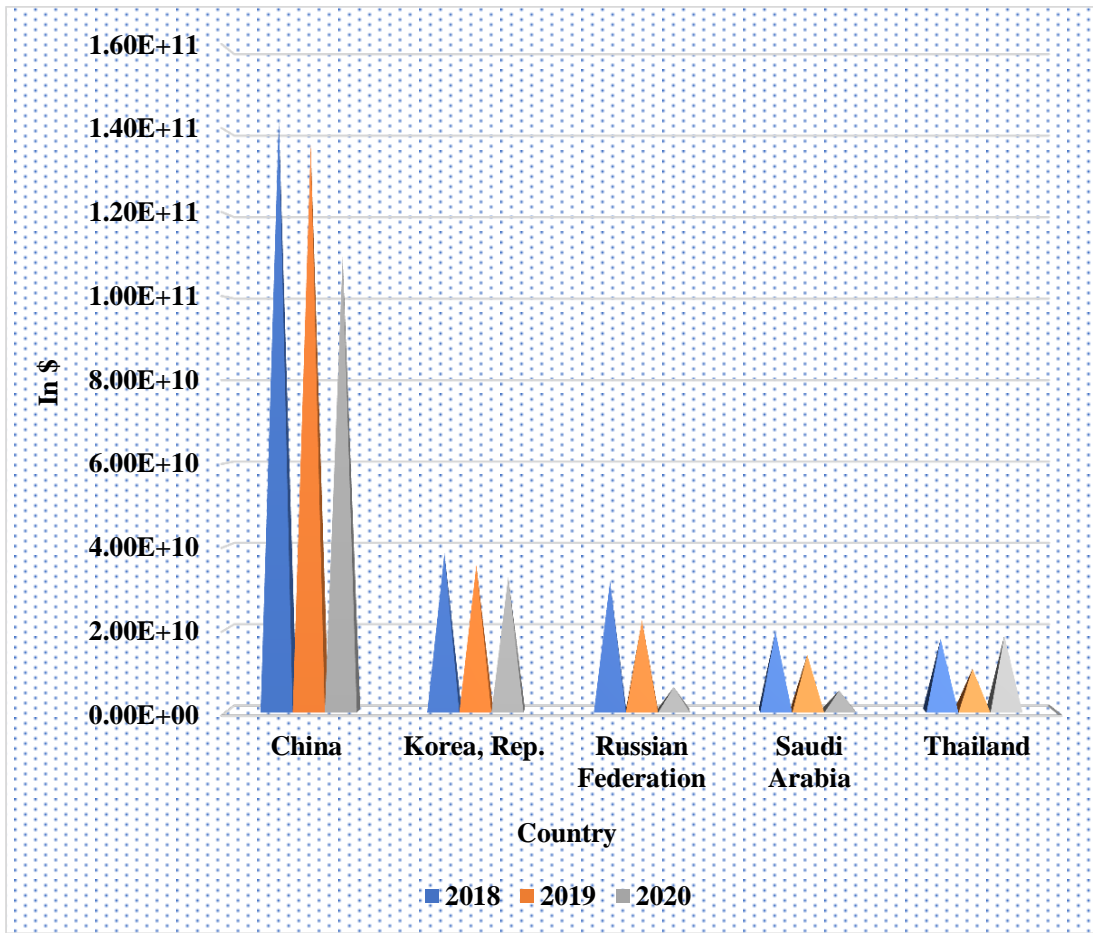
(In \$)

Sl. No	Countries	Pre Covid-Period	Post Covid Period	Post Covid Period
1	Albania	-4513335.96	39976866.35	50098202.04
2	Algeria	846211528.10	31148435.45	15467721.15
3	Argentina	1725981573.00	1539216163.00	1293824759.00
4	Armenia	7012505.83	-132995060.90	-27278869.12
5	Azerbaijan	1760877000.00	2431719000.00	825278000.00
6	Belarus	55200000.00	-3800000.00	77000000.00
7	Belize	718372.54	2118556.97	4428191.83
8	Bolivia	-84465303.84	48314312.66	-101838273.00
9	Bosnia and Herzegovina	18984277.86	122586614.40	79387438.41
10	Botswana	82078795.50	-19794884.66	-16930687.59
11	Brazil	2024569614.00	22819604502.00	-3467253502.00
12	Bulgaria	924350000.00	777440000.00	273220000.00
13	China	143026576683.86	136910000000.00	109922000000.00
14	Colombia	5126317721.00	3153496489.00	1720722236.00
15	Costa Rica	580752807.20	23888443.98	458738009.50
16	Croatia	319654286.90	226767467.50	249896281.90
17	Dominican Republic	209200000	-191800000.00	-99000000.00
18	El Salvador	-413302988.30	60523684.36	97317117.64
19	Fiji	-3630949.27	-36169632.41	13464175.43
20	Georgia	293607479.80	311883751.40	-15747722.79
21	Ghana	80850376.75	587766048.30	542413996.30
22	Guatemala	144535580.00	369887570.00	102513990.00
23	Honduras	547398049.80	455673192.60	-130228666.90
24	India	11417789536.00	13140702032.00	11122667604.00

Contd...

Sl. No	Countries	Pre Covid-Period	Post Covid Period	Post Covid Period
25	Indonesia	6399215529.00	4462481182.00	5034982615.00
26	Iraq	188400000.00	194200000.00	148500000.00
27	Jamaica	12670743.49	445990845.10	6692663.00
28	Kazakhstan	-4639277475.00	-2177488103.00	1359256145.00
29	Korea, Rep.	38220400000.00	35239000000.00	32479700000.00
30	Kyrgyz Republic	4954700.00	67205300.00	180886600.00
31	Malaysia	5765334992.00	7527950990.00	3639541211.00
32	Mexico	12122354163.00	5832862898.00	6135525140.00
33	Moldova	34670000.00	40090000.00	-3930000.00
34	Mongolia	27926874.18	126973658.20	25967215.38
35	Morocco	780869404.80	893137828.50	493405080.10
36	Namibia	96819997.91	8985484.64	51527083.74
37	Nicaragua	75100000.00	59100000.00	39500000.00
38	Nigeria	565569111.70	285318845.90	-337869298.20
39	Pakistan	-21000000.00	-85000000.00	34000000.00
40	Panama	569954004.80	2205305051.00	-3015743518.00
41	Paraguay	-128271144.00	73901982.03	54328296.82
42	Philippines	4115698240.00	3350936705.00	3525188483.00
43	Romania	1503441003.00	1923634040.00	568926664.20
44	Russian Federation	31376880000.00	21923140000.00	5721920000.00
45	Saudi Arabia	19252328473.00	13547065583.00	4854208727.00
46	South Africa	4026961508.00	3140937957.00	-1959793273.00
47	Sri Lanka	67856570.54	77362783.75	14542783.75
48	Suriname	11770006.34	91945040.18	691056.31
49	Tajikistan	-28288360.21	23212629.34	70334961.54
50	Thailand	17367987857.00	10144155290.00	18156573753.00
51	Tonga	-4093821.75	1443843.06	610658.32
52	Trinidad and Tobago	65041763.49	114158995.00	148359979.10
53	Turkey	3587000000.00	2943000000.00	3240000000.00
54	Ukraine	116000000.00	621000000.00	362000000.00
55	Uzbekistan	2021351.72	3087460.36	11309803.10
56	Vanuatu	1369286.26	1898506.33	1836905.04
57	Vietnam	598000000.00	485000000.00	380000000.00

Source: World Bank Report, 2020



Source: World Bank Report, 2020

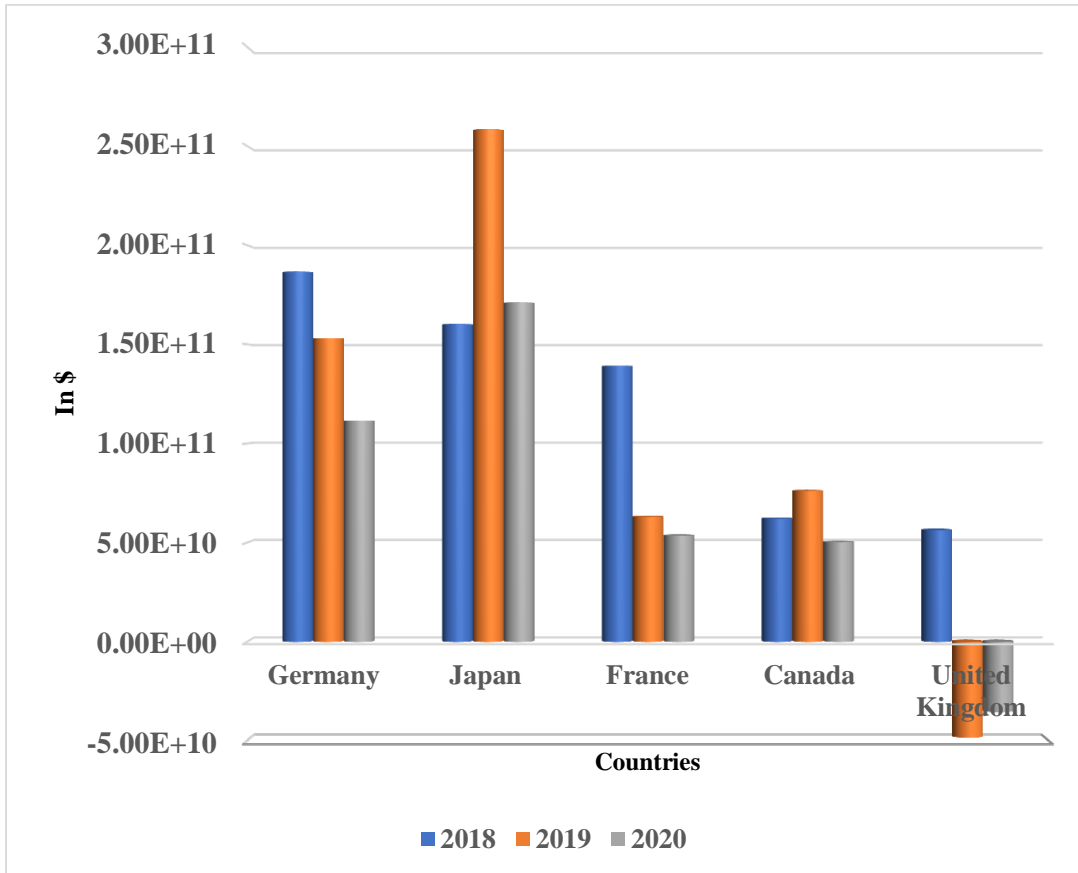
Figure 4: Top 5 Countries Foreign Direct Investment Outflow In Developed Countries (\$)

The table shows that China had a high FDI outflow in both before and after Covid period, with FDI outflow of \$143026576683.86 in 2018, \$ 136910000000.00 in 2019, and \$ 109922000000.00in 2020. The next contributor country is Korea Republic, which had experienced moderate rise in FDI outflow, which registered as \$38220400000 in 2018, \$35239000000 in 2019 and \$32479700000 in 2020.

Table 5: Foreign Direct Investment Outflow in Developed Countries**(In \$)**

Sl. No	Country Names	Pre Covid -Period	Post Covid Period	Post Covid Period
1	Australia	998461668.30	10514494955.00	12459235099.00
2	Austria	-26584148161.00	-689950262.10	-14772888860.00
3	Belgium	-36001467215.00	-34798044202.00	-19436263973.00
4	Canada	62093299901.00	76172736352.00	50244717664.00
5	Chile	1309261954.00	9339445700.00	11724838538.00
6	Cyprus	-11891278846.00	20025285438.00	713091387.00
7	Czech Republic	6079923725.00	4776298839.00	3277827384.00
8	Denmark	6722598275.00	6391667725.00	13295782665.00
9	Estonia	-226936184.20	1849288665.00	324208707.90
10	Finland	3152243197.00	7043213428.00	4474852716.00
11	France	13917600000.00	63023876199.00	53556736457.00
12	Germany	18665400000.00	15314800000.00	11148400000.00
13	Iceland	-151722470.80	164847776.70	-361282827.20
14	Japan	16021800000.00	25845800000.00	17113900000.00
15	Latvia	-315328684.50	86944462.96	191936891.80
16	Malta	-7143209722.00	-6613457958.00	-6737365131.00
17	Netherlands	-273628405462.18	-12643300000.00	-20022900000.00
18	New Zealand	695384370.10	-1530613882.00	769272205.00
19	Norway	14402618833.00	8187478272.00	-6038552980.00
20	Poland	233900000.00	477200000.00	465900000.00
21	Portugal	1453893233.00	1632043071.00	-355754812.70
22	Singapore	22035128907.00	50578073171.00	32375480917.00
23	Sweden	12809616663.00	23103218503.00	29395206352.00
24	Switzerland	-34681094478.00	72845508014.00	-71155205511.00
25	United Kingdom	56396272185.00	-48231870351.00	-35335898577.00
26	United States	-13001600000.00	12219100000.00	31169200000.00
27	Uruguay	2273017889.00	59414275.81	-2070958012.00

Source: World Bank Report, 2020



Source: World Bank Report, 2020

Figure 5: Top 5 Countries Foreign Direct Investment Outflow In Developed Countries(\$)

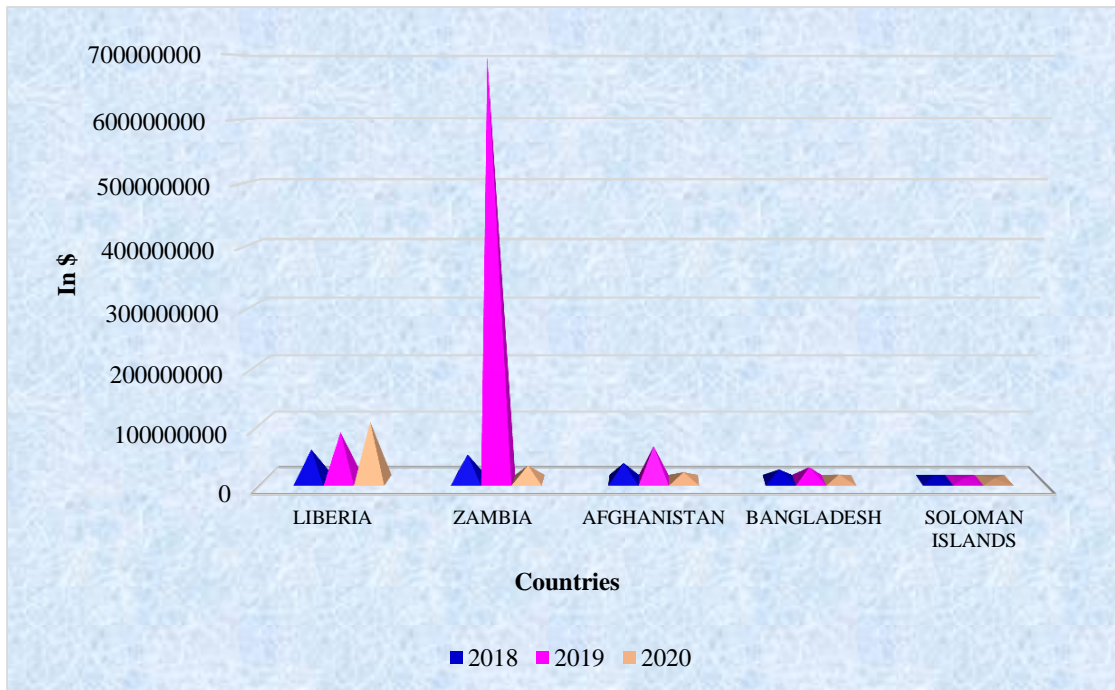
The table shows that among the developing countries, the foreign direct investment outflow was higher in Germany in before and after COVID period. In 2018, the FDI outflow was 186654000000.00, and it grew to 153148000000.00 in 2019, and 111484000000.00 in 2020. The next important country with higher foreign direct investment was Japan, which has had moderate rise in FDI outflows, with outflows 160218000000.00 in 2018, 258458000000.00 in 2019, and 171139000000.00 in 2020.

Table-6
Foreign Direct Investment Outflow in Less Developed Countries

(In \$)

Sl.No	Countries	Pre covid Period	Post Covid Period	Post Covid Period
1	Afghanistan	30370487.7	59757863.33	14270325.38
2	Angola	5714167.485	-2349425835	90514469
3	Bangladesh	19210044.2	23061761.96	10125989.88
4	Gambia	-3684993.404	-1626694.13	-3483809.206
5	Liberia	54174249.79	84075747.64	101971099.2
6	Mozambique	-14089797.87	-30886189.9	153380151
7	Sao tome and principle	2393964.463	938906.448	853447.1633
8	Solo man islands	9055533.461	4047714.086	3326629.214
9	Zambia	45322767.3	696213536.5	6165544.25

Source: World Bank Report, 2020



Source: World Bank Report, 2020

Figure 6: Top 5 Countries Foreign Direct Investment Outflow in Less Developed Countries(\$)

The table shows that the foreign direct investment outflow was higher in Liberia with Foreign Direct Investment outflow of \$ 54174249.79 in the pre COVID period, increased to \$ 84075747.64 in 2019 and \$ 10125989.88 in 2020. Next to Liberia, higher amount of foreign direct investment outflow was noticed in Zambia. The foreign direct investment outflow was \$ 45322767.3 in the pre COVID period in 2018, increased to \$ 696213536.5 in 2019 and declined to \$6165544.25 in 2020.

4.3 Employment Ratio among World Countries

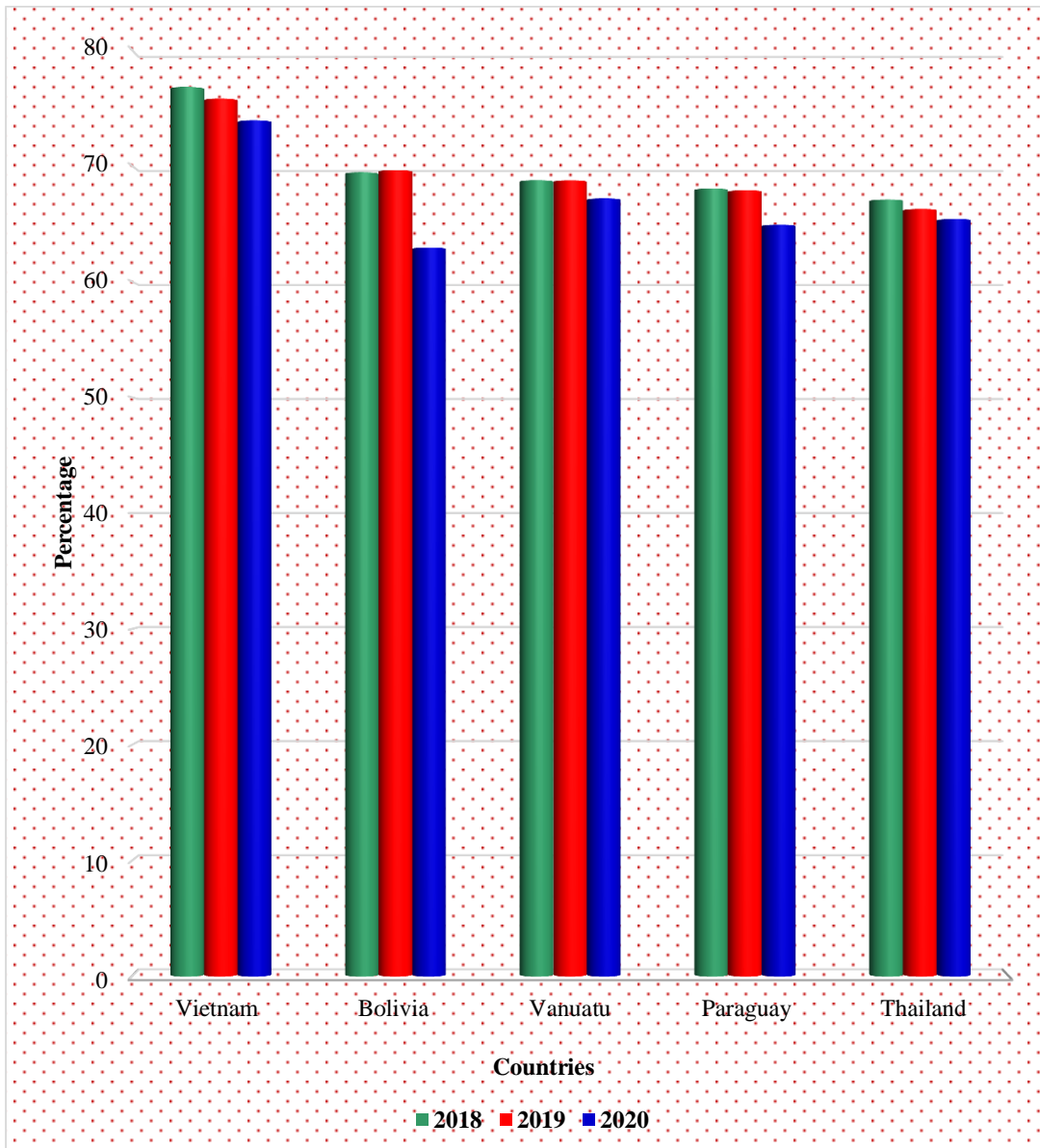
Table 7: Employment Ratio in Developing Countries

(Percentage of GDP)

Sl. No	Countries	Pre Covid-Period	Post Covid Period	Post Covid Period
1	Albania	52.03	53.41	52.73
2	Algeria	37.61	37.51	35.13
3	Argentina	55.73	55.55	49.44
4	Armenia	43.08	42.97	39.98
5	Azerbaijan	63.56	63.28	59.17
6	Belarus	61.46	61.04	59.79
7	Belize	60.81	61.02	56.55
8	Bolivia	69.42	69.61	62.92
9	Bosnia and Herzegovina	38.01	40.01	38.47
10	Botswana	58.42	58.41	57.1
11	Brazil	56.15	56.76	51.14
12	Bulgaria	52.57	54.35	51.68
13	China	65.76	65.1	63.48
14	Colombia	62.42	61.05	52.97
15	Costa Rica	56.19	57.06	50.27
16	Croatia	47.03	48.07	47.64
17	Dominican Republic	61.86	62.71	56.24
18	El Salvador	56.57	56.78	48.77
19	Fiji	55.3	55.19	53.45
20	Georgia	56.16	56.26	56.17
21	Ghana	65.07	65.02	63.21
22	Guatemala	60.92	61.16	54.4
23	Honduras	64.87	65.13	54.34
24	India	46.79	46.74	43

Sl. No	Countries	Pre Covid-Period	Post Covid Period	Post Covid Period
25	Indonesia	64.47	65.54	63.72
26	Iraq	37.39	37.49	35.66
27	Jamaica	59.85	61.52	58.8
28	Kazakhstan	65.75	65.51	62.06
29	Korea, Rep.	60.61	60.89	60.06
30	Kyrgyz Republic	55.05	54.91	50.64
31	Malaysia	62.64	62.59	61.27
32	Mexico	58.71	59.28	53.79
33	Moldova	37.05	39.39	37.77
34	Mongolia	57.26	59.62	60.24
35	Morocco	41.3	41.28	38.3
36	Namibia	47.28	47.65	46.79
37	Nicaragua	63.18	63.23	61.07
38	Nigeria	50.39	51.1	48.61
39	Pakistan	50.3	50.42	47.91
40	Panama	64.03	64.11	56.21
41	Paraguay	68.02	67.87	64.9
42	Philippines	58.18	58.69	55.11
43	Romania	52.75	52.97	52.38
44	Russian Federation	59.23	58.66	57.62
45	Saudi Arabia	52.15	52.45	50.61
46	South Africa	40.93	40.12	36.69
47	Sri Lanka	50.65	50.26	48.65
48	Suriname	48.14	48.08	44.13
49	Tajikistan	37.66	37.04	36.01
50	Thailand	67.07	66.26	65.39
51	Tonga	45.45	45.45	43.56
52	Trinidad and Tobago	58.47	58.06	53.09
53	Turkey	47.16	45.54	43.37
54	Ukraine	49.57	49.72	47.52
55	Uzbekistan	58.39	58.25	55.75
56	Vanuatu	68.74	68.73	67.17
57	Vietnam	76.79	75.79	73.91

Source: World Bank Report, 2020



Source: World Bank Report, 2020

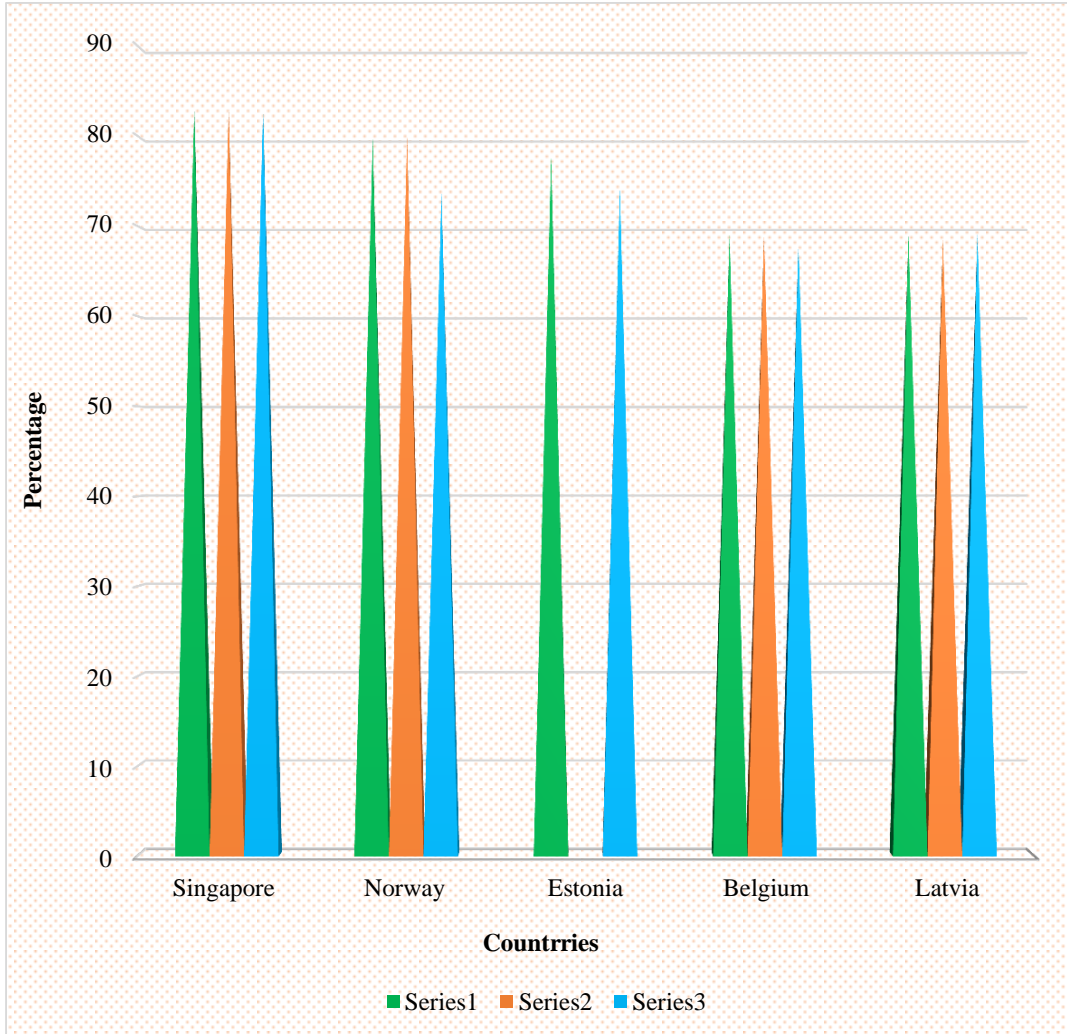
Figure 7: Top 5 Countries Employment Ratio In Developing Countries(%)

The table shows that Vietnam had a high Employment Ratio both before and after Covid, with a 2018 Employment Ratio of 76.79, rising to 75.79 in 2019 and 73.91 in 2020. The next contributor country, Bolivia, has experienced moderate growth in the employment ratio, receiving 69.42 in 2018 and increasing to 69.61 in 2019 and 62.92 in 2020.

Table 8: Employment Ratio in Developed Countries**(Percentage of GDP)**

Sl. No	Countries	Pre-Covid Period	Post-Covid Period	Post-Covid Period
1	Australia	57.79	58.5	56.45
2	Austria	63.56	63.28	59.17
3	Belgium	69.11	69.12	68.2
4	Canada	54.67868706	55.01828777	54.1838206
5	Chile	65.76	65.1	63.48
6	Cyprus	59.41	59.29	57.92
7	Czech Republic	58.77	59.32	57.96
8	Denmark	61.86	62.71	56.24
9	Estonia	77.82	77.67	74.3
10	Finland	55.3	55.19	53.45
11	Germany	53.58	53.55	51.92
12	Iceland	61.52	61.28	59.31
13	Japan	65.75	65.51	62.06
14	Latvia	69.1	68.62	69.17
15	Malta	61.9	60.11	55.6
16	Netherlands	61.5	61.71	60.79
17	New Zealand	57.21259556	57.4284167	54.86667025
18	Norway	79.94	80.11	73.8
19	Poland	60.34183222	60.46974873	58.53632108
20	Portugal	68.02	67.87	64.9
21	Singapore	83.32	83.34	83.17
22	Sweden	40.55	40.78	38.96
23	Switzerland	54.71	54.53	53.08
24	United Kingdom	56.16	56.26	56.17
25	United States	58.39	58.25	55.75
26	Uruguay	59.89	60.27	56.31

Source: World Bank Report, 2020



Source: World Bank Report, 2020

Figure 8: Top 5 Countries Employment Ratio In Developed Countries (%)

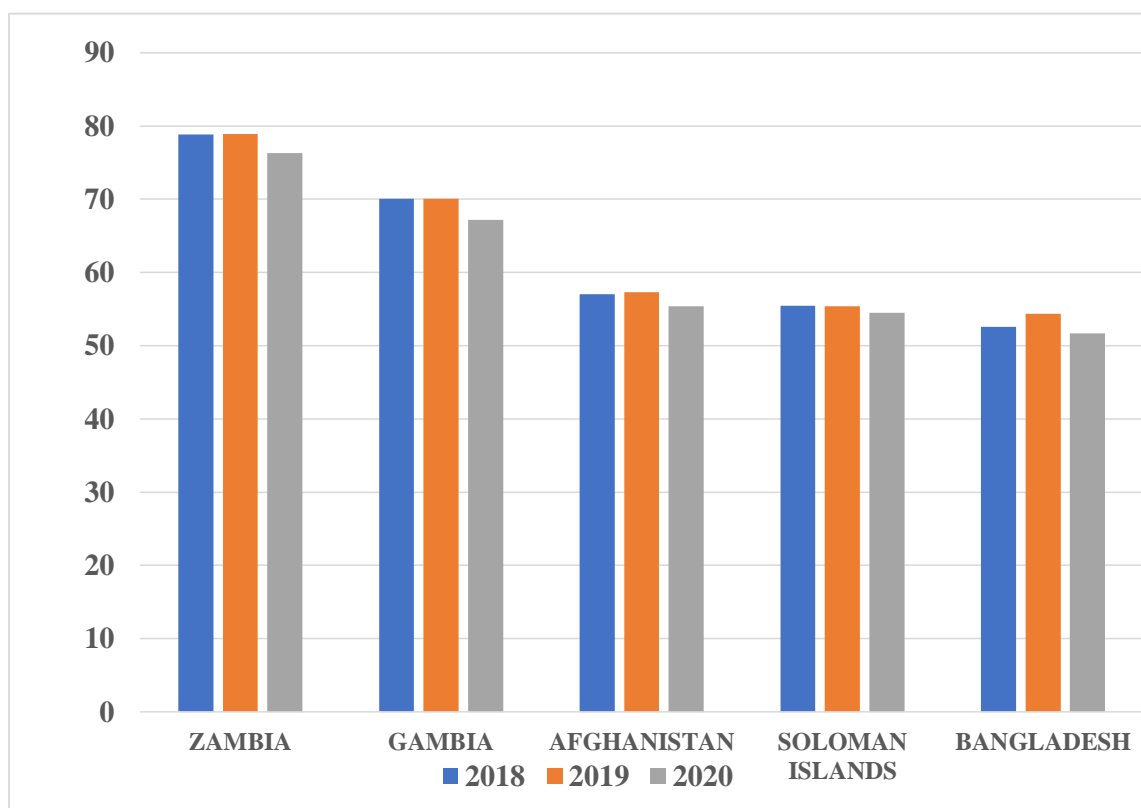
Among the developing countries, higher employment rate was noticed in Singapore in both pre and post COVID period. In the pre COVID period, the employment rate was 83.32 percent in 2018 and increased to 83.34 percent in 2019. In the post COVID period, the employment rate had declined to 83.17 percent in 2020. The next country with high employment rate was Norway, which had experienced moderate growth in the employment in both pre and post COVID period with 79.94 percent in 2018 and increasing to 80.11 percent in 2019 and 73.8 percent in 2020.

Table 9: Employment Rate in Less Developed Countries

(Percentage of Gross Domestic Product)

Sl. No	Countries	Pre-Covid Period	Post- Covid Period	Post -Covid Period
1	Zambia	78.85	78.91	76.28
2	Gambia	70.05	70.06	67.15
3	Afghanistan	57.01452	57.31608	55.39704
4	Solo man islands	55.43	55.37	54.48
5	Bangladesh	52.57	54.35	51.68
6	Angola	52.03	53.41	52.73
7	Sao tome and principle	48.14	48.08	44.13
8	Mozambique	40.72	40.77	39.81
9	Liberia	40.55	40.58	38.81

Source: World Bank Report, 2020



Source: World Bank Report, 2020

Figure 9: Top 5 Countries Employment Rate In Less Developed Countries(%)

The table shows that the employment rate was higher in Zambia in both pre and post COVID period, with an employment ratio of 78.85 in 2018, 78.91 in 2019 and declined to 76.28 in 2020. The next important country with higher employment rate was Gambia. In the pre COVID period in 2018, the employment rate was 70.05 in 2018, 70.06 in 2019 declined to 67.15 in 2020.

4.4 Gross Domestic Product among World Countries

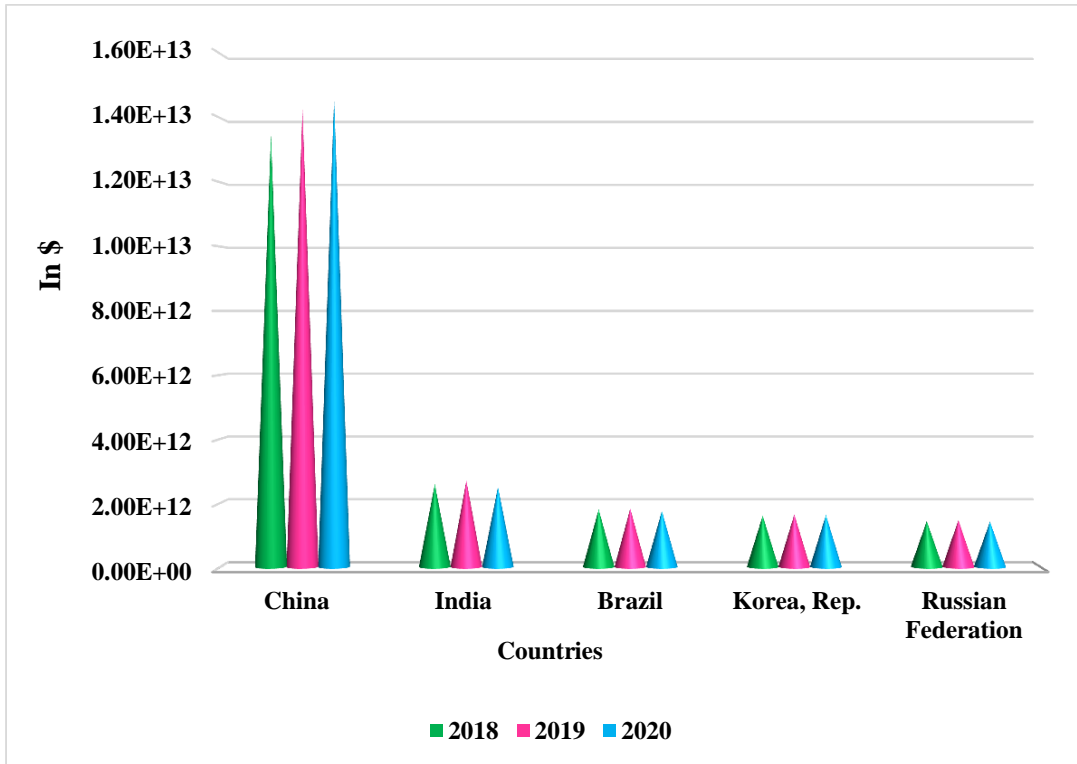
Table 10: Gross Domestic Product in Developing Countries

(In \$)

Sl. No	Countries	Pre-Covid Period	Post-Covid Period	Post-Covid Period
1	Albania	12702457552	12970913828	12457862571
2	Algeria	175426000000.00	177180000000.00	168144000000.00
3	Argentina	583118000000.00	571305000000.00	514772000000.00
4	Armenia	11958639114.00	12867495686.00	11915301005.00
5	Azerbaijan	52304901978.00	53612524527.00	51307185973.00
6	Belarus	58198692498.00	59013474193.00	58482352925.00
7	Belize	1803268968.00	1835056956.00	1577955711.00
8	Bolivia	37364958856.00	38193230058.00	34820961247.00
9	Bosnia and Herzegovina	17906901110.00	18413845946.00	17825164474.00
10	Botswana	15717831996.00	16188225469.00	14813376719.00
11	Brazil	1797740000000.0	1823105452462.95	1749100000000.00
12	Bulgaria	55214529018.00	57443866470.00	54923717978.00
13	China	13493400000000.	14296238286985.1	14631800000000.0
14	Colombia	311468000000.00	321688000000.00	299826000000.00
15	Costa Rica	62862775555.00	64281157839.00	61668979511.00
16	Croatia	55265833941.00	57190160217.00	52557893779.00
17	Dominican Republic	84993382979.00	89287391493.00	83287065055.00
18	El Salvador	25172679891.00	25772439480.00	23560825997.00
19	Fiji	5246541361.00	5223164712.00	4402511311.00
20	Georgia	16915132067.00	17757903230.00	16557390869.00
21	Ghana	58648966892.00	62465709576.00	62724594623.00
22	Guatemala	68004474884.00	70634110392.00	69560946555.00
23	Honduras	23565812342.00	24191028957.00	22022361225.00
24	India	2590900000000.00	2695611314661.46	2500130000000.00
25	Indonesia	999179000000.00		1027600000000.00
26	Iraq	191222000000.00	202614000000.00	170858000000.00
27	Jamaica	14802050819.00	14934128283.00	13440715454.00
28	Kazakhstan	202016000000.00	211107000000.00	205829000000.00
29	Korea, Rep.	1601900000000.00	1637850078348.95	1623900000000.00
30	Kyrgyz Republic	7572253084.00	7920624103.00	7238139485.00

Sl. No	Countries	Pre-Covid Period	Post-Covid Period	Post-Covid Period
31	Malaysia	349191000000.00	364693000000.00	344099000000.00
32	Mexico	1255070000000.00	1252848919131.02	1148750000000.00
33	Moldova	8830205886.00	9155458066.00	8517409876.00
34	Mongolia	13422599496.00	14174566300.00	13528524725.00
35	Morocco	109959000000.00	112827000000.00	105726000000.00
36	Namibia	11341482623.00	11240759011.00	10285277742.00
37	Nicaragua	13487252999.00	12991624157.00	12734736954.00
38	Nigeria	492075000000.00	502942000000.00	493918000000.00
39	Pakistan	318956000000.00	322607000000.00	319590000000.00
40	Panama	62154564176.00	64006593334.00	52520697209.00
41	Paraguay	40841037918.00	40676916123.00	40446808661.00
42	Philippines	373379000000.00	396225000000.00	358294000000.00
43	Romania	208644000000.00	217383000000.00	208839000000.00
44	Russian Federation	1430120000000.00	1459189098326.43	1416120000000.00
45	Saudi Arabia	676339000000.00	678581000000.00	650715000000.00
46	South Africa	358307000000.00	358712000000.00	335640000000.00
47	Sri Lanka	90088341600.00	92119992735.00	88832160056.00
48	Suriname	5195656628.00	5252729242.00	4417127638.00
49	Tajikistan	10189698258.00	10943735892.00	11436203955.00
50	Thailand	450539000000.00	460750000000.00	432649000000.00
51	Tonga	482638835.70	486181549.60	489364573.40
52	Trinidad and Tobago	22872883186.00	22587789317.00	20813757909.00
53	Turkey	988642000000.00	997437000000.00	1015330000000.00
54	Ukraine	98783526701.00	101944000000.00	97866338856.00
55	Uzbekistan	100427000000.00	106161000000.00	107982000000.00
56	Vanuatu	837054151.30	869804185.70	810535805.60
57	Vietnam	234736000000.00	251209000000.00	258509000000.00

Source: World Bank Report, 2020



Source: World Bank Report 2020

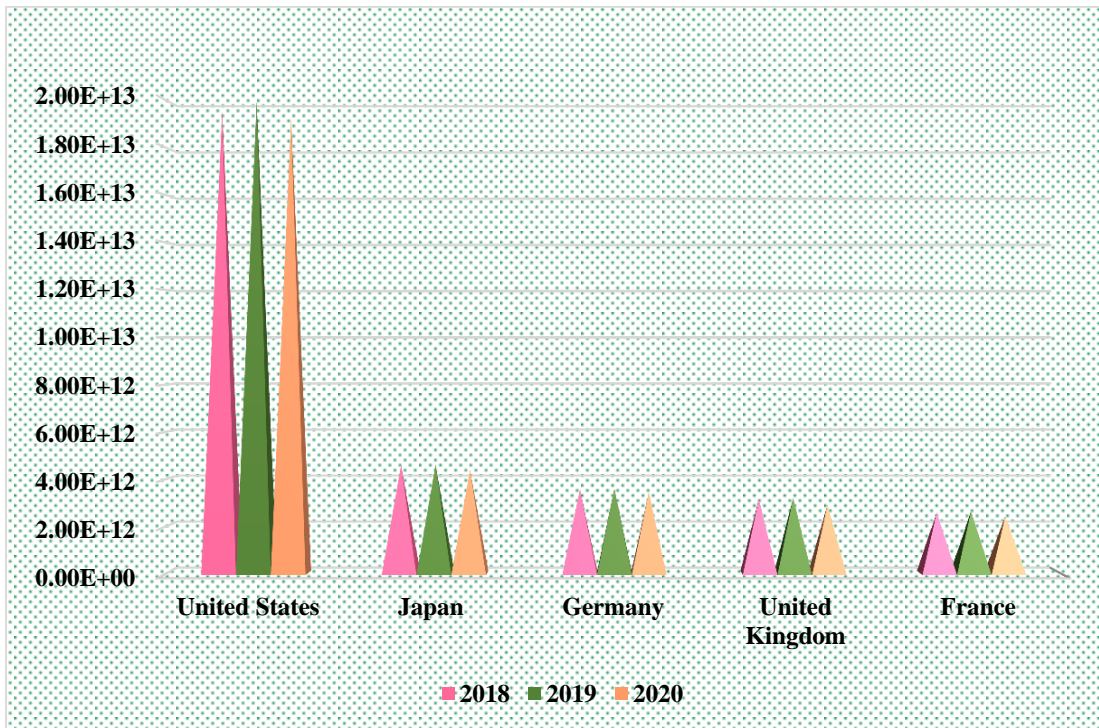
Figure 10: Top 5 Countries Gross Domestic Product In Developing Countries(\$)

The table shows that the Gross Domestic Product in China was higher compared to other countries among the developed countries in both before and after COVID period. The Gross Domestic Product in the year 2018 was 13493400000000.00, and it increased to \$ 14631800000000.00 in 2020. The next important country with higher Gross Domestic Product was India which accounted for \$2590900000000.00 in 2018 and \$2695611314661.46 in 2019 and in 2500130000000.00 2020.

Table 11: Gross Domestic Product in Developed Countries**(In \$)**

Sl. No	Counties	Pre Covid -Period	Post Covid Period	Post Covid Period
1	Australia	1460170000000.00	1491030000000.00	1490970000000.00
2	Austria	408170000000.00	414257000000.00	386359000000.00
3	Belgium	484235000000.00	494644000000.00	466649000000.00
4	Canada	1659240000000.00	1690130000000.00	1600330000000.00
5	Chile	260354000000.00	262807000000.00	247639000000.00
6	Cyprus	23632267890.00	24880804888.00	23579790561.00
7	Czech Republic	209255000000.00	215595000000.00	203104000000.00
8	Denmark	327708000000.00	334638000000.00	327738000000.00
9	Estonia	26002976732.00	27068147757.00	26269347955.00
10	Finland	251566000000.00	254947000000.00	247628000000.00
11	France	2568420000000.00	2615760000000.00	2410290000000.00
12	Germany	3561300000000.00	3598890000000.00	3434440000000.00
13	Iceland	20351810853.00	20847341425.00	19491448632.00
14	Japan	4578910000000.00	4591290000000.00	4380760000000.00
15	Latvia	29971449461.00	30716038079.00	29604557971.00
16	Malta	13129078609.00	13856372628.00	12886270021.00
17	Netherlands	823802000000.00	839913000000.00	808007000000.00
18	New Zealand	197516000000.00	200743000000.00	204482000000.00
19	Norway	403459000000.00	406896000000.00	403780000000.00
20	Poland	544289000000.00	570115000000.00	555630000000.00
21	Portugal	216466000000.00	222273000000.00	203508000000.00
22	Singapore	344278000000.00	348910000000.00	330100000000.00
23	Sweden	539113000000.00	549821000000.00	533612000000.00
24	Switzerland	749096000000.00	758168000000.00	740026000000.00
25	United Kingdom	3139010000000.00	3191490000000.00	2882120000000.00
26	United States	19552000000000.00	19974500000000.00	19247100000000.00
27	Uruguay	55319478843.00	55513344382.00	52260972282.00

Source: World Bank Report, 2020



Source: World Bank Report, 2020

Figure 11: Top 5 Countries Gross Domestic Product in Developed Countries (\$)

The table shows that higher Gross Domestic Product was noticed in both pre and post COVID period in United States. In the pre COVID period, it was \$19552000000000.00 and in the post COVID period, it was accounted as \$19974500000000.00 in 2019 and declined to \$19247100000000.00 in 2020. Next important country with higher Gross Domestic Product was Japan. The Gross Domestic Product in Japan was \$4578910000000.00 in the pre COVID period and in the post COVID period, it was 4591290000000.00 in 2019 and 4380760000000.00 declined to in 2020.

Table 12: Gross Domestic Product in Less Developed Countries

(In \$)

Sl. No	Countries	Pre-Covid Period	Post-Covid Period	Post-Covid Period
1	Afghanistan	20323488525.00	21118462797.00	20621946476.00
2	Angola	110764000000.00	110073000000.00	104129000000.00
3	Bangladesh	241805000000.00	261519000000.00	270696000000.00
4	Gambia	1579264906.00	1676447056.00	1672833038.00
5	Liberia	3292571599.00	3211334058.00	3115542651.00
6	Mozambique	17772233412.00	18183590595.00	17959222232.00
7	Sao tome and principle	351971392.30	359752972.30	370868351.90
8	Solo man islands	1515367566.00	1533613349.00	1467403273.00
9	Zambia	23747586257	24089861649	23418945737

Source: World Bank Report, 2020

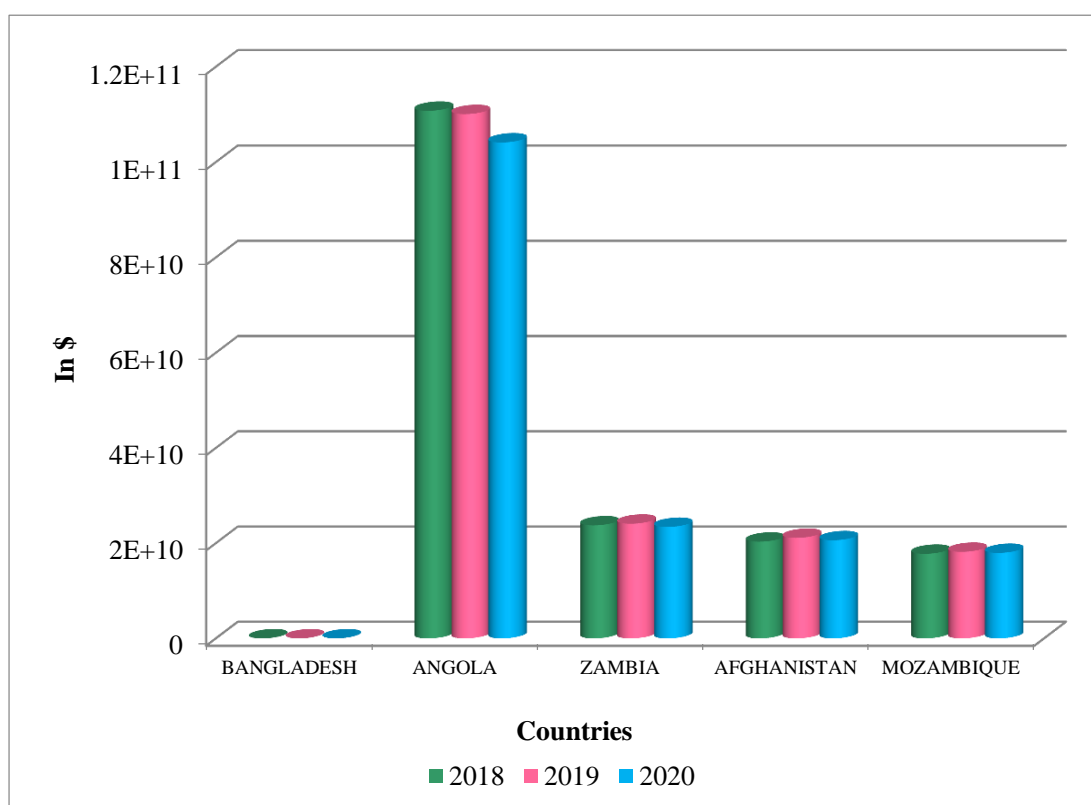


Figure 12: Top 5 Countries Gross Domestic Product in Less Developed Countries

Higher Gross Domestic Product was noticed in Bangladesh followed by Angola in both pre and post COVID period. The value of Gross Domestic Product in Bangladesh was 241805000000.00 was in 2018 and in 261519000000.0 2019, 270696000000.00 in 2020. The value of Gross Domestic Product in Angola was 110764000000.00 in 2018 and it was 110073000000.00 and 104129000000.00 in 2020. The gross domestic product had declined in many of the less developed countries in the post COVID period.

4.5 Covid-19 Cases and Death Cases under COVID-19 among World Countries

Covid-19 Cases in Developing Countries

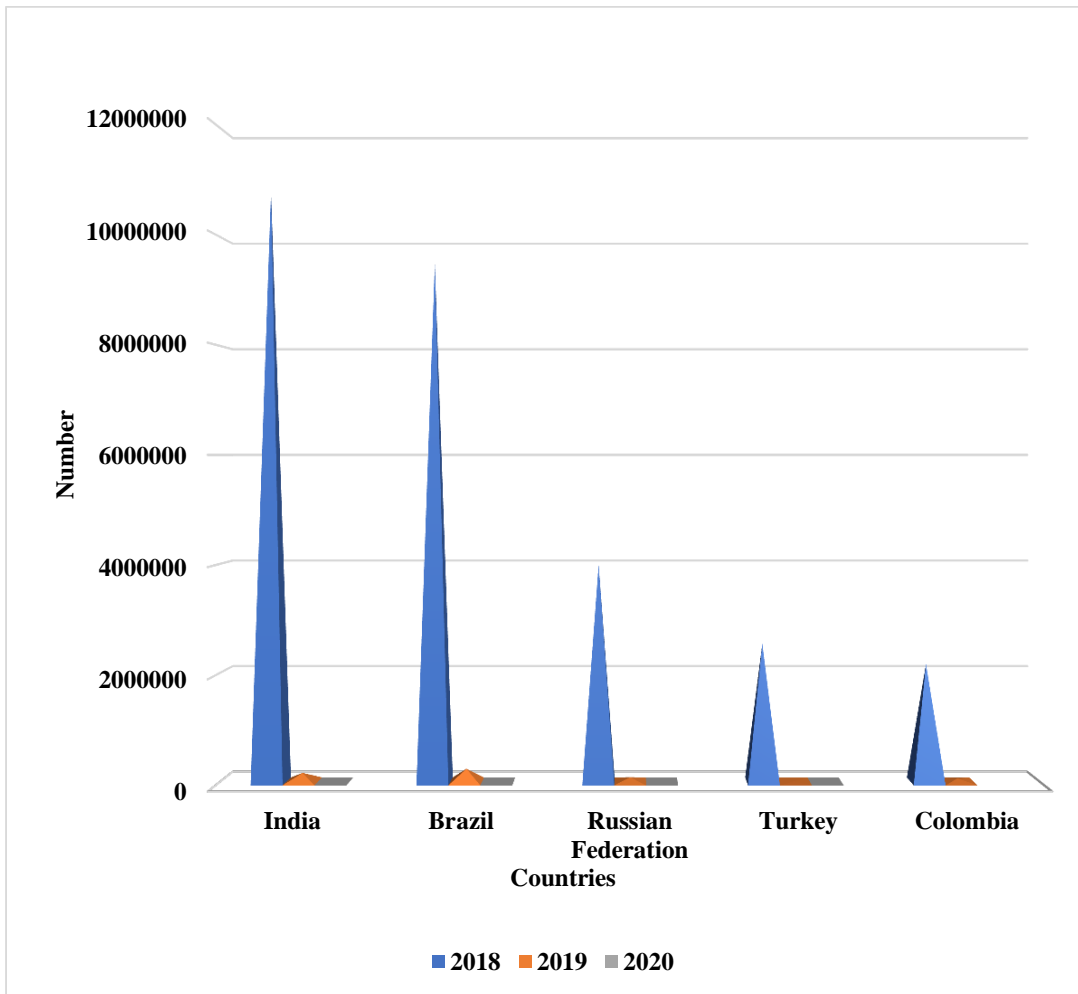
Table 13: Covid-19 Cases and Death Cases under COVID-19 among World Countries Covid-19 Cases in Developing Countries

(In Number)

Sl. No	Countries	Covid-19 Cases	Covid-19 Death Cases
1	Albania	85336	1460
2	Algeria	10908	2914
3	Argentina	1980347	49171
4	Armenia	168177	3123
5	Azerbaijan	231154	3158
6	Belarus	259499	1792
7	Belize	12037	306
8	Bolivia	227967	10796
9	Bosnia and Herzegovina	123434	4775
10	Botswana	23508	163
11	Brazil	9524640	231561
12	Bulgaria	223734	9331
13	China	89706	4636
14	Colombia	2157216	55593
15	Costa Rica	196438	2672
16	Croatia	234473	5198
7	Dominican Republic	223398	2831
18	El Salvador	56653	1692
19	Fiji	56	2
20	Georgia	26228	3298
21	Ghana	71333	464
22	Guatemala	163137	5884
23	Honduras	154568	3721
24	India	10838843	155114

Sl. No	Countries	Covid-19 Cases	Covid-19 Death Cases
25	Indonesia	1116079	31763
26	Iraq	630263	13126
27	Jamaica	17085	358
28	Kazakhstan	196115	2540
29	Korea, Rep.	86992	1557
30	Kyrgyz Republic	85113	1431
31	Malaysia	245552	896
32	Mexico	1932145	166200
33	Moldova	164569	3543
34	Mongolia	2073	2
35	Morocco	475355	8394
36	Namibia	34973	375
37	Nicaragua	6299	170
38	Nigeria	139748	1667
39	Pakistan	555511	1535
40	Panama	327091	5480
41	Paraguay	138118	2826
42	Philippines	538995	11231
43	Romania	746637	18961
44	Russian Federation	3983197	77068
45	Saudi Arabia	370634	6406
46	South Africa	1476135	46290
47	Sri Lanka	69862	356
48	Suriname	8671	161
49	Tajikistan	13308	90
50	Thailand	23557	79
51	Tonga	0	0
52	Trinidad and Tobago	7616	135
53	Turkey	2531456	7214
54	Ukraine	1246990	23644
55	Uzbekistan	79112	621
56	Vanuatu	1	0
57	Vietnam	2056	35

Source: World Bank Report, 2020



Source: World Bank Report, 2020

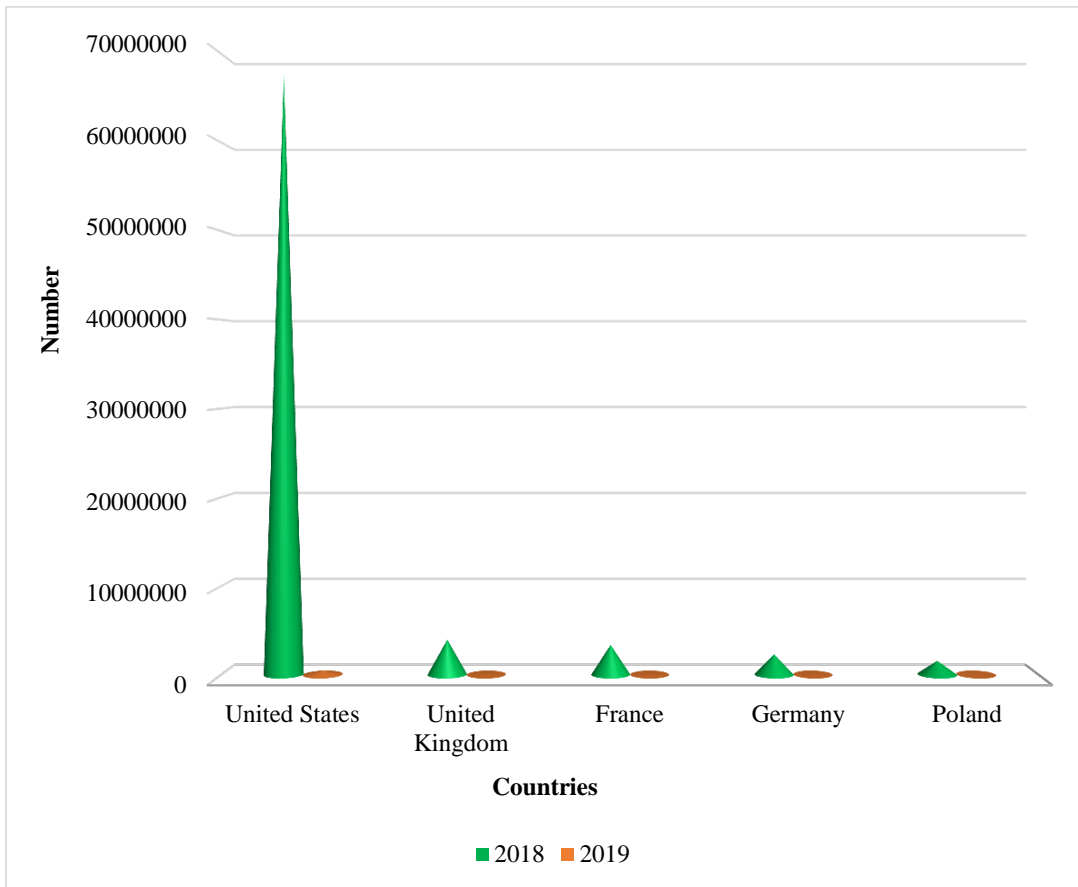
Figure 13: Top 5 Countries Covid-19 Cases In Developing Countries

The table showed that the number of COVID cases and death were higher in number in India in 2019 and 2020 with 10838843 and 155114 cases respectively. The next important country was Brazil with the COVID cases of 9524640 and death of 231561 cases respectively.

Table 14: Covid-19 Cases and Death Cases in Developed Countries**(in Number)**

Sl. No	Countries	Covid-19 Cases	Covid-19 Death Cases
1	Australia	28857	909
2	Austria	424896	8092
3	Belgium	725610	21389
4	Canada	804260	20767
5	Chile	751886	18974
6	Cyprus	31759	212
7	Czech Republic	1037405	1733
8	Denmark	202051	2216
9	Estonia	48267	461
10	Finland	47969	688
11	France	3337048	78965
12	Germany	2292215	62181
13	Iceland	6020	29
14	Japan	404147	6351
15	Latvia	72088	1347
16	Malta	18813	282
17	Netherlands	1005760	14403
18	New Zealand	2320	25
19	Norway	64772	582
20	Poland	1552686	39132
21	Portugal	765414	14158
22	Singapore	599721	29
23	Sweden	588062	12115
24	Switzerland	535153	9268
25	United Kingdom	3945680	112465
26	United States	67612486	474938
27	Uruguay	45311	490

Source: World Bank Report, 2020



Source: World Bank Report, 2020

Figure 14: Top 5 Countries Covid-19 Cases and Death Cases in Developed Countries

Among the developed countries, the number of COVID cases and death were higher in United Kingdom with 67612486 Covid cases and 474938 Covid death cases in 2018. The next important country with higher number of COVID cases was United Kingdom. The number of COVID cases was 3945680 and death was 112465 in 2020 in United Kingdom.

Table 15: Covid 19 Cases and Death Cases in Less Developed Countries
(In Number)

Sl. No.	Countries	Covid-19 Cases	Covid-19 Death Cases
1	Afghanistan	55384	2414
2	Angola	20086	475
3	Bangladesh	538378	8221
4	Gambia	4237	134
5	Liberia	1956	84
6	Mozambique	44600	460
7	Sao tome and principle	1351	18
8	Solomon Islands	17	0
9	Zambia	63573	869

Source: World Bank Report, 2020

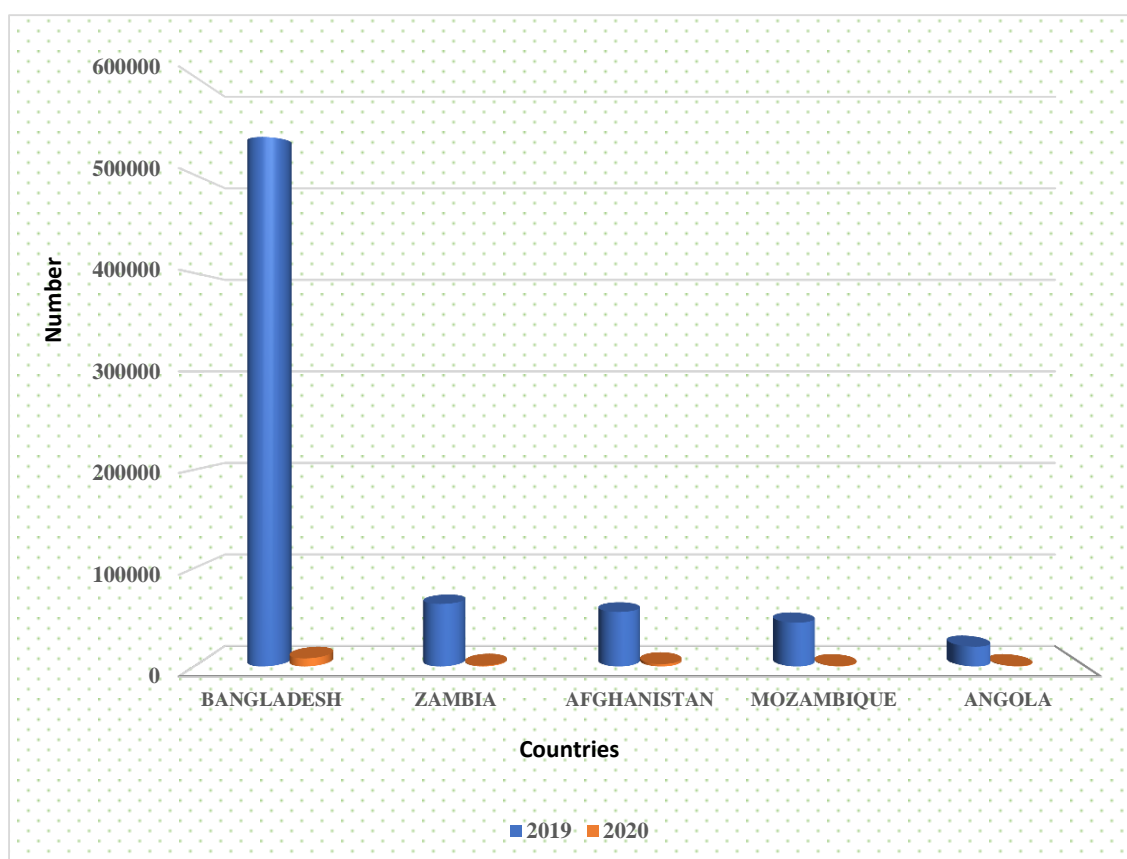


Figure 15: Top 5 Countries Covid 19 Cases and Death in Less Developed Countries

Higher number of COVID cases and death under COVID cases was noticed in Bangladesh with 538378 and 8221 respectively in the year 2020. The next important country in COVID cases and death under COVID cases was Zambia where, the number of COVID cases was 63573 and the death under COVID was 869 in 2020.

4.6. Comparison of Foreign Direct Investment, Employment, Gross Domestic Product, Covid 19 Cases and Death under Covid 19 - t-Test

Independent sample t test was applied to compare the Foreign Direct Investment Inflow, Outflow and Employment between the pre and post COVID period, among developing, developed and least developed countries, t test was applied. The table shows the results of independent sample t test pertaining to less Developing Countries.

Table 16: Comparison of Foreign Direct Investment, Employment, Gross Domestic Product, Covid 19 Cases and Death Under Covid -19 in Developing Countries - t-Test

Variables	t Value	P Value	Inference
Foreign Direct Investment Inflow	-0.111	0.912	Insignificant
Foreign Direct Investment Outflow	-0.914	0.365	Insignificant
Employment	-1.610	0.113	Insignificant
Gross Domestic Product	-8.362	0.000	Significant

Source: World Bank Report, 2020

H0: Mean foreign direct investment inflow, outflow and employment did not differ significantly in developing countries

Ha: Mean foreign direct investment inflow, outflow and employment differed significantly in developing countries

The estimated t value pertaining to Gross Domestic Product was 8.362. It was statistically significant at one percent level. It revealed that the null hypothesis of gross domestic product did not differ significantly between pre and post COVID period was rejected. It means that the gross domestic product had differed significantly between pre

and post COVID period. The foreign direct investment inflow, outflow and employment did not differ significantly between pre and post COVID time period which was statistically in significant in developing countries.

The table shows the results of independent sample t test pertaining to developed countries.

Table 17: Comparison of Foreign Direct Investment, Employment, Gross Domestic Product, Covid 19 Cases and Death under Covid 19 in Developed Countries - t-Test

Variables	't' Value	P Value	Inference
Foreign Direct Investment Inflow	-1.245	0.225	Insignificant
Foreign Direct Investment Outflow	-1.463	0.156	Insignificant
Employment	0.341	0.736	Insignificant
Gross Domestic Product	-61.706	0.000	Significant

Source: World Bank Report, 2020

H₀: Mean foreign direct investment inflow, outflow and employment did not differ significantly in developing countries

H_a: Mean foreign direct investment inflow, outflow and employment differed significantly in developing countries

The estimated t value pertaining to Gross Domestic Product was -61.706. It was statistically significant. The null hypothesis of gross domestic product did not differ significantly between pre and post COVID period was rejected. The foreign direct investment inflow, outflow and employment were statistically in significant. They did not differ significantly between pre and post COVID period.

The table shows the results of independent sample t test pertaining to Less Developed Countries.

Table 18: Comparison of Foreign Direct Investment, Employment, Gross Domestic Product, Covid 19 Cases and Death under Covid 19 in Less Developed Countries - t-Test

Variables	t Value	p Value	Inference
Foreign Direct Investment Inflow	-0.075	0.942	Insignificant
Foreign Direct Investment Outflow	0.821	0.435	Insignificant
Employment	-7.808	0.000	Significant at on percent level
Gross Domestic Product	-2.280	0.052	Significant at five percent level

Source: Estimated, based on the data from World Bank, 2020

H₀: Mean foreign direct investment inflow, outflow and employment did not differ significantly in less developed countries

H_a: Mean foreign direct investment inflow, outflow and employment differed significantly in less developed countries

The estimated t value pertaining to Employment and Gross Domestic Product was 7.808 and 2.280. They were statistically significant at five percent level. It revealed that the null hypothesis of Gross Domestic Product and employment differed significant between pre and post COVID time period was rejected. Gross Domestic Product and Employment had differed significantly between pre and post COVID period. Other factors were statistically in significant in less developed countries.

4.7. Relationship between Gross Domestic Product, Inflow, Outflow, Employment, Covid -19 Cases, Death under Covid Cases in Pre and Post Covid Period in Developing, Developed and Less Developed Countries –Simple Linear Regression

To analyze the relationship between Gross Domestic Products, Foreign Direct Investment Inflow, Foreign Direct Investment Outflow, Employment, COVID 19 cases, and COVID 19 death cases among less developed, developing, and developed countries,

simple linear regression analysis was performed. The results of simple linear regression for developed countries are shown in the table.

Table 19: Relationship between Gross Domestic Product, Inflow, Outflow, Employment, Covid-19 Cases, Death under Covid Cases in Pre and Post Covid Period in Developed Countries –Simple Linear Regression

Variables	Unstandardized coefficient B	Standardized coefficient Beta	t-value	P value	Inference
Pre Covid-19 Foreign Direct Investment Inflow	0.034	0.226	1.136	0.267	Insignificant
Post Covid-19 Foreign Direct Investment Inflow	-0.696	-0.533	-3.083	0.005	Significant at one percent level
Pre Covid-19 Foreign Direct Investment Outflow	-0.002	-0.163	-0.811	0.425	Insignificant
Post Covid-19 Foreign Direct Investment Outflow	0.28	0.152	0.755	0.458	Insignificant
Post Covid-19 Foreign Direct Investment Outflow	0.044	0.281	1.433	0.165	Insignificant
Pre Covid-19 Employment	0.985	0.040	0.981	0.000	Significant at one percent level
Post Covid-19 employment	-3.244	-0.255	-1.291	0.209	Insignificant
Post Covid-19 Employment	-3.254	-0.256	-1.298	0.207	Insignificant
Post Covid-19 Covid Cases	-0.604	0.734	5.291	0.000	Significant at one percent level
Post Covid-19 Covid Death Cases	-0.498	0.710	4.943	0.000	Significant at one percent level

Source: Estimated, based on the data from World Bank,2018, 2019 and 2020

The following null and alternate hypotheses were tested to analyze the relationship between Gross Domestic Product, Foreign Direct Investment inflow, Foreign Direct Investment Outflow, Employment, COVID -19 cases and death in the pre and post COVID period in developed countries.

HO: Employment, Foreign Direct Investment, COVID 19 cases and death cases under COVID -19 are independent of gross domestic product in both pre and post COVID period

HA: Employment, Foreign Direct Investment, COVID 19 cases and death cases under COVID -19 are dependent of gross domestic product in both pre and post COVID period

In the developed countries, the factors such as the foreign direct investment in the post COVID period, employment in the pre COVID period, COVID cases and death under COVID cases were statistically significant to determine the Gross Domestic Product. Among the above significant factors, foreign direct investment in the post COVID period had negative relationship with the gross domestic product. Increase in foreign direct investment had reduced the gross domestic product. The employment in the pre COVID period had positive relationship with the gross domestic product. Increase in COVID cases had increased the gross domestic product. The regression coefficient of cases under COVID -19 and death under COVID 19 had negative relationship with the gross domestic product. Increase in cases under COVID cases and death under COVID 19 had reduced the Gross Domestic Product. Other factors such as Foreign Direct Investment outflow was statistically in significant.

The results of regression analysis pertaining to the relationship between Gross Domestic Product, Foreign Direct Investment Inflow, Foreign Direct Investment Outflow, Employment, Covid -19 Cases, Death in pre and post COVID period in developing countries are shown table.

Table 20: Relationship Between gross Domestic Product and Foreign Direct Investment Inflow, Outflow, Employment, Covid -19 Cases, Death in Pre and Post Covid Period in Developing Countries –Simple Linear Regression

Variables	Unstandardized coefficient B	Standardized coefficient Beta	t-value	P value	Inference
Pre Covid-19 Foreign Direct Investment Inflow	-0.772	-0.400	-3.146	0.003	Significant at one percent level
Post Covid-19 Foreign Direct Investment Inflow	-.0857	-.0356	-2.747	0.008	Significant at one percent level
Pre Covid-19 Outflow 2018	0.105	0.429	3.420	0.001	Significant at one percent level
Post Covid-19 Foreign Direct Investment Outflow	0.100	0.370	2.870	0.006	Significant at one percent level
Post Covid-19 Foreign Direct Investment Outflow	0.066	0.278	2.084	0.042	Significant at five percent level
Pre Covid-19 Employment	0.975	.091	0.658	0.513	In Significant
Post Covid-19 Employment	0.701	0.064	0.464	0.645	In Significant
Post Covid-19 Employment	0.680	0.062	0.499	0.656	In Significant
Post Covid-19 Covid Cases	0.460	0.638	5.974	0.000	Significant at one percent level
Post Covid-19 Covid Death Cases	0.450	0.611	5.573	0.000	Significant at one percent level

Source: Estimated from the World Bank Data, 2020

HO: Employment COVID 19 cases and death cases under covid -19 are independent of gross domestic product in both pre and post COVID period

HA: Employment COVID 19 cases and death cases under covid -19 are dependent of gross domestic product in both pre and post COVID period

In the developing countries, the factors such as the foreign direct investment inflow and outflow in the pre and post COVID period, COVID cases and death under COVID cases were statistically significant to determine the Gross Domestic Product. Among the above significant factors, foreign direct investment in the post COVID period had negative relationship with the gross domestic product. Increase in foreign direct investment had reduced the gross domestic product. The foreign direct investment inflow and outflow in the pre COVID period had positive relationship with the Gross Domestic Product. Increase in the foreign direct investment inflow in the pre and post COVID period had increased the gross domestic product. The employment in the pre and post COVID period had turned out to be statistically insignificant to determine the gross domestic product. The COVID cases registered and death under COVID cases were also statistically significant to determine the gross domestic product. Increase in COVID cases had reduced the gross domestic product among the developing countries.

4.8. Relationship Between Gross Domestic Product, Foreign Direct Investment Inflow, Foreign Direct Investment Outflow, Employment, Covid -19 Cases, Death Under Covid 19 Cases in Pre and Post Covid Period in Less Developed Countries -Simple Linear Regression

The relationship between Gross Domestic Product, Foreign Direct Investment Inflow, Foreign Direct Investment Outflow, Employment, COVID -19 cases, Death under COVID 19 cases in pre and post COVID period in less developed countries was analyzed based on Simple linear regression. The results of simple linear regression analysis are shown in table.

Table 21: Relationship Between gross Domestic Product, Inflow, Outflow, Employment, Covid -19 Cases, Death in Pre and Post Covid Period in Less Developed Countries -Simple Linear Regression

Variables	Unstandardized Coefficient B	Standardized Coefficient Beta	T-Value	P Value	Inference
Pre Covid-19 Foreign Direct Investment Inflow	-1.005	-.0505	-1.550	0.165	In Significant
Post Covid-19 Foreign Direct Investment Inflow	-0.386	-0.163	-0.438	0.674	In Significant
Pre Covid-19 Foreign Direct Investment Outflow	0.058	0.197	0.532	0.611	In Significant
Post Covid-19 Foreign Direct Investment Outflow	-0.009	-0.038	-0.100	0.923	In Significant
Post Covid-19 Foreign Direct Investment Outflow	0.161	0.436	1.281	0.241	In Significant
Pre Covid-19 Employment	-1.005	-0.505	-1.550	0.165	In Significant
Post Covid-19 Employment	1.037	0.106	0.283	0.786	In Significant
Post Covid-19 Employment	1.403	0.146	0.391	0.707	In Significant
POST COVID-19 Covid Cases	0.555	0.777	3.271	0.014	Significant At Five Percent
Post Covid-19 Covid Death Cases	0.642	0.805	3.596	0.009	Significant One Percent Level

Source: Estimated from the World Bank Data, 2020

The following null and alternate hypotheses were tested to analyze the relationship between Gross Domestic Product, Inflow, Outflow, Employment, COVID -19 cases and death in the pre and post COVID period in less developed countries.

HO: Employment, COVID 19 cases and death cases under covid -19 are independent of gross domestic product in both pre and post COVID period

HA: Employment, COVID 19 cases and death cases under covid -19 are dependent of gross domestic product in both pre and post COVID period

The results of regression analysis show that among the selected variables, COVID-19 cases and death under COVID cases were statistically significant to determine gross domestic product of less developed countries. The estimated regression coefficient pertaining to cases under COVID cases was -0.555 which had negative relationship with gross domestic product. Increase in COVID cases had reduced the gross domestic product. The estimated regression coefficient pertaining to death under COVID cases was -0.642. It had also negative relationship with gross domestic product. Other factors such as the foreign direct investment inflows and outflows in both pre and post COVID period were statistically insignificant.

4.9 Interrelationship Between Foreign Direct Investment Inflow, Outflow, Employment And Gross Domestic Product –Path Analysis

Interrelationship between imports, exports and gross domestic product was analyzed using path analysis. The following path model was specified to analyze the interrelationship between the foreign direct investment inflow, outflow, employment and gross domestic product.

The following null and alternate hypotheses were tested

H0: There is no causal relationship among the foreign direct investment inflow, outflow, employment and gross domestic product.

Ha: There is no causal relationship among the foreign direct investment inflow, outflow, employment and gross domestic product.

Table 22: Goodness of Fit Test Statistics

Goodness of fit Statistics	Test statistics value
Chi Square	0.0040
RMSEA	0.05
The comparative fit Index	0.693
Tucker –Lewis Index	0.821

Source: Estimated from the World Bank Data,2020

The results showed that the chi square was statistically significant. The Root mean squared error of approximation, the comparative fit index and Tucker –Lewis Index were about 0.8 which indicates better fit of the model.

Direct Relationship

The direct relationship in the path analysis showed that the pre COVID employment was a significant factor in determining the gross domestic product in the pre COVID period. The estimated employment coefficient was negative indicating negative relationship with gross domestic. Increase in employment had reduced the gross domestic product in the pre COVID period. The foreign direct investment inflow and outflow were statistically insignificant to determine the gross domestic product.

In the post COVID period, the estimated path coefficients of foreign direct investment inflow, outflow, employment and COVID cases were statistically significant to influence the gross domestic product. The path coefficient of foreign direct investment inflow was negative. Increase in foreign direct investment had reduced the gross domestic product in the post COVID period. Other factors, such as foreign direct investment outflow, employment and COVID cases turned out to be positive. Increase in direct investment outflow, employment and COVID cases had increased the gross domestic product.

4.10 Interrelationship between Foreign Direct Investment Inflow Outflow, Employment and Gross Domestic Product –Direct Relationship

Table 23: Interrelationship between Foreign Direct Investment Inflow, Outflow, Employment Ratio and Gross Domestic Product-Path Analysis

Path	Path Coefficients	Z Value	P Value	Level of Significance
Pre-Covid Direct Investment→Pre -Covid Gross Domestic Product	-0.2263128	-0.22	0.824	Insignificant
Pre-Covid Employment →Pre-Covid Gross Domestic Product	-1.871984	-1.93	0.053	Significant
Post Foreign Direct Inflow→Post Gross Domestic Product	-0.5871458	-3.90	0.000	Significant
Post-Covid Foreign Direct Outflow→Post-Covid Gross Domestic Product	0.0461421	2.56	0.010	Significant
Post-Covid Employment →post-Covid gross Domestic Product	1.990447	2.39	0.017	Significant
Post-Covid Cases →Post -Covid Gross Domestic Product	0.4283641	3.21	0.001	Significant
Post-Covid Death Cases→Post-Covid Gross Domestic Product	0.0674311	0.49	0.621	Insignificant

Source: Estimated from the World Bank Data, 2020

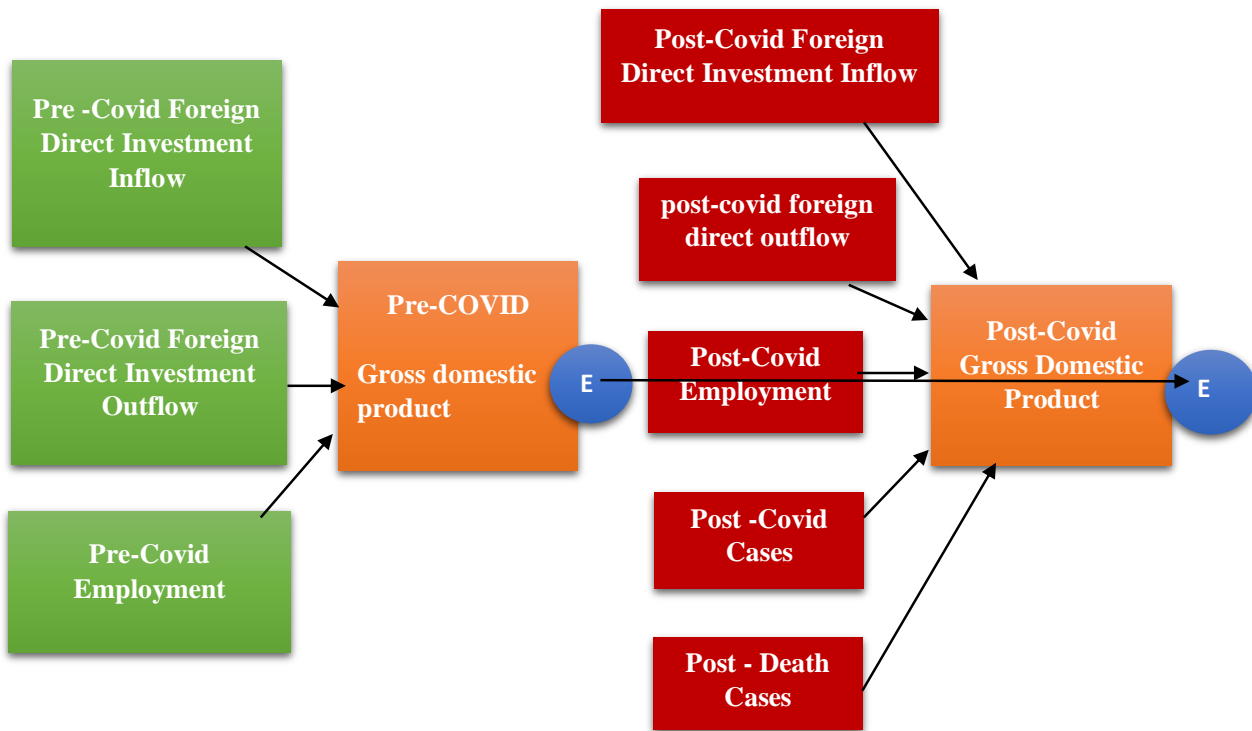


Figure 16: Interrelationship between Foreign Direct Investment, Employment and Gross Domestic Product – Path Analysis

Indirect Relationship

The indirect effect among the **Foreign Direct Investment Inflow, Outflow, Employment and Gross Domestic Product** was analyzed. The results of the indirect relationship are given in table.

4.11. Interrelationship between Foreign Direct Investment Inflow, Outflow, Employment and Gross Domestic Product –Indirect Relationship

Table 24: Interrelationship between Foreign Direct Investment Inflow, Outflow, Employment and Gross Domestic Product –Indirect Relationship

Path	Path Coefficients	Z Value	P Value	Level of Significance
Pre-Covid Foreign Direct Investment Inflow→ Pre Covid-Gross Domestic Product	0.008098	0.22	0.824	Insignificant
Pre - Covid Foreign Direct Investment Outflow→ Pre-Covid Gross Domestic Product	-0.0056306	-1.21	0.224	Insignificant
Pre- Covid Foreign Direct Investment Employment → Pre - Covid Gross Domestic Product	0.0669838	1.49	0.137	Insignificant

Source: Estimated from the World Bank Data,2020

In the indirect relationship of path analysis, none of the path co efficient were statistically significant. The path co efficient pertaining to foreign direct investment inflow, foreign direct investment outflow and employment were statistically in significant

The results of total effects in path analysis are shown in table.

4.12 Interrelationship between Foreign Direct Investment Inflow Outflow, Employment and Gross Domestic Product –Total Effects

Table 25: Interrelationship between Foreign Direct Investment Inflow Outflow, Employment and Gross Domestic Product –Total Effects

Path	Path Coefficients	Z Value	P Value	Level Of Significance
Pre-COVID Employment → Pre COVID-Gross Domestic Product	-1.871984	-1.93	0.053	Significant
Pre-Covid Gross Domestic Product → Post-COVID Gross Domestic Product	-0.0357823	-2.33	0.020	Significant
Post-Foreign Direct Investment Inflow → Post-COVID Gross Domestic Product	-0.5871458	-3.90	0.000	Significant
Post-Foreign Direct Investment Outflow → Post-COVID Gross Domestic Product	0.0461421	2.56	0.017	Significant
Post-COVID Cases → Post-COVID Gross Domestic Product	0.4283641	3.21	0.001	Significant

Source: Estimated from the World Bank Data, 2020

In the total effects, the path such as Pre COVID employment → pre-GDP, Pre GDP → post GDP, Post inflow → post GDP, post FDI outflow → post GDP and post COVID cases → post GDP were statistically significant. Among the above path coefficient, the path coefficient pertaining to employment, pre COVID gross domestic product, post COVID inflow and COVID cases were negative. Increase in employment, pre COVID gross domestic product, post COVID inflow and COVID cases had reduced the gross domestic product. The path coefficient such as post COVID foreign direct investment outflow was positive. Increase in foreign direct investment outflow had increased gross domestic product in the post COVID period.

CHAPTER - 5

SUMMARY AND CONCLUSION

Corona virus disease (COVID-19) was first reported in Wuhan, People's Republic of China in December 2019 and spread worldwide. In an attempt to control the spread of the virus, many countries introduced social distancing and lockdown orders and imposed entry bans on foreigners, severely curtailing economic activity. According to the International Monetary Fund (2021), the global economy in 2020 contracted 3.2% and global trade by 8.3%. The pandemic caused a more dramatic fall in foreign direct investment (FDI) in 2020. According to United Nations Conference on Trade and Development (2021), global FDI flows dropped by 35% to \$1 trillion in 2020, from \$1.5 trillion in 2019. Thus, in 2020, global FDI decreased more considerably than global gross domestic product or trade. FDI is often vulnerable to economic and various other types of shocks. Past studies have noted the negative effects of financial crises (Dornean, Işan, and Oanea 2012; Dornean and Oanea 2015; Poulsen and Hufbauer 2011; Stoddard and Noy 2015) and disasters triggered by natural hazards (Anuchitworawong and Thampanishvong 2015, Escaleras and Register 2011) on FDI. Financial crises lead to liquidity constraints for investors, whereas disasters triggered by natural hazards destroy physical infrastructure such as roads and industrial parks. Compared with these shocks, one of the most distinctive features of the COVID-19 pandemic is the forced adoption of infection prevention measures such as lockdowns and social distancing. These measures raise the costs for pre-investment investigation, searching costs for location and workers, and running costs of FDI. Moreover, the COVID-19 pandemic has yet again illustrated the vulnerability of global trade and value chains to external shocks. When a country in the global value chain suffers a big COVID-19 outbreak leading to shutdowns of its factories, the entire global supply chain can be disrupted. To minimize and diversify the risk of disruptions, many companies have been tempted to reduce their reliance on concentrated production in foreign countries (Lee and Park 2020).

In this backdrop, the studies attempted to analyse the relationship between COVID 19 and foreign direct investment, employment. But they did not analyse the relationship between COVID 19, foreign direct investment and employment simultaneously and compare the relationship among the above variables between pre and post COVID period. The research gaps were taken care of in the present study on "Relationship Between Gross Domestic Product, Employment, Foreign Direct Investment and Covid

19 Among World Countries – A Comparative Study Between Pre and Post Covid Period” The following are the specific objectives of the study.

Objectives

- To analyse the Foreign Direct Investment Inflow, Outflow and Employment among the world countries
- To assess the COVID cases and death under COVID cases among the countries
- To compare Foreign Direct Investment Inflow, Outflow and Employment and Gross Domestic Product between pre and post COVID period
- To study the relationship between Foreign Direct Investment inflow and outflow and employment among the developed, developing and less developed countries

Hypothesis

The following null hypotheses were tested to fulfil the objectives of the study

1. The Foreign Direct Investment inflow, outflow and employment did not differ significantly between pre and post COVID period
2. Gross Domestic Product was independent of foreign direct investment inflow, outflow and employment in both pre and post COVID period
3. There is no direct and indirect relationship among foreign direct investment inflow, outflow , employment and COVID cases.

Methodology

As the world countries were affected by the COIVID 19, the study on “**Relationship between the** Gross Domestic product, Employment, Foreign Direct Investment, and COVID-19 among World Countries” was conducted.

Selection of the Countries, Collection of Data and Period of the Study

Selection of countries

The world countries such as Afghanistan, Bangladesh ,Burkina Faso, Burundi, Central African Republic, Chad, Colombia, Congo, Dem. Rep., Eritrea, Ethiopia, Guinea, Haiti, Kenya, Kyrgyz Republic, Liberia, Madagascar, Malawi, Mali,

Mozambique, Myanmar, Nepal, Niger, Rwanda, Sierra Leone, Somalia, South Sudan, Syrian Arab Republic, Tajikistan, Tanzania, Togo, Uganda, Zimbabwe, Armenia, Bolivia, Cameroon, Congo Rep., Cote d'Ivoire, Egypt, Arab Rep., El Salvador, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Lao PDR, Mauritania, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Senegal, Sri Lanka, Sudan, Syrian Arab Republic, Ukraine, Uzbekistan, Vietnam, West Bank and Gaza, Yemen, Rep., Albania, Algeria, Angola, Argentina, Azerbaijan, Belarus, Bosnia and Herzegovina, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Hungary, Iran, Islamic Rep, Iraq, Japan, Kazakhstan, Lebanon, Libya, Malaysia, Mexico, Panama, Peru, Romania, Serbia, South Africa, Thailand, Tunisia, Turkey, Turkmenistan, Venezuela, RB, Australia, Austria, Belgium, Canada, Chile, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, China, Ireland, Israel, Italy, Japan, Korea, Rep. Lithuania, Netherlands, New Caledonia, New Zealand, Norway, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States, Uruguay were affected by COVID-19. Therefore the above countries were included in the study on **“Relationship between the Gross Domestic product, Employment, Foreign Direct Investment, and COVID-19 among World Countries”**

Collection of data and Period of Study

The data for the study were secondary in nature. The empirical data on the gross domestic product, world imports, world exports were collected from the following secondary sources

1. World meter -2021
2. World bank data – 2020-2021
3. World Health Organisation Data base, 2021

To analyse the effect of COVID-19 on foreign direct investment and employment, the period 2018 was considered as pre COVID period and the period 2019 - 2020 was considered as post COVID period. Therefore, the study period was confined to the period of 2018 -2020.

The following were the important econometric and statistical tools used in the present study to fulfill the objectives of the study.

- t test
- Simple linear regression models
- Path analysis

Findings

The major findings of the study are as under

Foreign Direct Investment Inflow, Outflow, Employment Ratio, Gross Domestic Product and Covid-19 Cases among Countries

- Among developing countries, Mongolia experienced high FDI inflows in both before and after Covid period, with FDI inflows of 14.8089 percent in 2018 and 17.1989 percent in 2019. The next contributor country is Panama, which has had moderate growth in FDI inflows, with an inflow of 8.4511 percent in 2018 and an increase to 8.7951 percent.
- Among Developed Countries, Malta experienced high FDI inflows in both before and after Covid period, with FDI inflows of 30.09701982 in 2018 and 17.19893953 in 2019. The next contributor country is Singapore, which has had moderate growth in FDI inflows, with an inflow of 22.10501951 in 2018 and an increase to 32.16983711 in 2019.
- Among Less Developed Countries, the inflow of foreign direct investment was higher in Mozambique. In the pre COVID period, the inflow of foreign direct investment was \$ 18.03997027 in 2018 which declined to 14.17491392 in 2019. This was followed by the next important country, Saotome and principle. In the pre COVID period, it was 7.748478468 in 2018 and in the post COVID period, it was 5.659892909 in 2019. In the COVID period, it was 5.659892909 in 2020.
- Among developing countries, China had a high FDI outflow in both before and after Covid period, with FDI outflow of \$143026576683.86 in 2018, \$136910000000.00 in 2019, and \$ 109922000000.00 in 2020. The next contributor country is Korea Republic, which had experienced moderate rise in FDI outflow, which registered as \$38220400000 in 2018, \$35239000000 in 2019 and \$32479700000 in 2020..
- Among Developed Countries, the foreign direct investment outflow was higher in Germany in before and after COVID period. In 2018, the FDI outflow

was 186654000000.00, and it grew to 153148000000.00 in 2019, and 111484000000.00 in 2020. The next important country with higher foreign direct investment was Japan, which has had moderate rise in FDI outflows, with outflows 160218000000.00 in 2018, 258458000000.00 in 2019, and 171139000000.00 in 2020.

- Among Less Developed Countries, the foreign direct investment outflow was higher in Liberia with Foreign Direct Investment outflow of \$54174249.79 in the pre COVID period, increased to \$ 84075747.64 in 2019 and \$10125989.88 in 2020. Next to Liberia, higher amount of foreign direct investment outflow was noticed in Zambia. The foreign direct investment outflow was \$45322767.3 in the pre COVID period in 2018, increased to \$ 696213536.5 in 2019 and declined to \$6165544.25 in 2020.
- Among developing countries, Vietnam had a high Employment Ratio in both before and after Covid, with a 2018 Employment Ratio of 76.79, declined to 75.79 in 2019 and 73.91 in 2020. The next contributor country, Bolivia, has experienced moderate growth in the employment ratio, receiving 69.42 in 2018 and increasing to 69.61 in 2019 and declined to 62.92 in 2020.
- Among Developed Countries higher employment rate was noticed in Singapore in both pre and post COVID period. In the pre COVID period, the employment rate was 83.32 percent in 2018 and increased to 83.34 percent in 2019. In the post COVID period, the employment rate had declined to 83.17 percent in 2020. The next country with high employment rate was Norway, which had experienced moderate growth in the employment in both pre and post COVID period with 79.94 percent in 2018 and increasing to 80.11 percent in 2019 and 73.8 percent in 2020.
- Among Less Developed Countries, the employment rate was higher in Zambia in both pre and post COVID period, with an employment ratio of 78.85 in 2018, 78.91 in 2019 and declined to 76.28 in 2020. The next important country with higher employment rate was Gambia. In the pre COVID period in 2018, the employment rate was 70.05 in 2018, 70.06 in 2019 declined to 67.15 in 2020.
- Among developing countries, the Gross Domestic Product in China was higher compared to other countries among the developed countries in both before and

after COVID period. The Gross Domestic Product in the year 2018 was 13493400000000.00, and it increased to \$ 14631800000000.00 in 2020. The next important country with higher Gross Domestic Product was India which accounted for \$2590900000000.00 in 2018 and \$2695611314661.46.

- Among Developed Countries, higher Gross Domestic Product was noticed in both pre and post COVID period in United States. In the pre COVID period, it was \$19552000000000.00 and in the post COVID period, it was accounted as \$19974500000000.00 in 2019 and declined to \$19247100000000.00 in 2020. Next important country with higher Gross Domestic Product was Japan. The Gross Domestic Product in Japan was \$45789100000000.00 in the pre COVID period and in the post COVID period, it was \$45912900000000.00 in 2019 and \$43807600000000.00 declined to in 2020.
- Among Less Developed Countries, higher Gross Domestic Product was noticed in Bangladesh followed by Angola in both pre and post COVID period. The value of Gross Domestic Product in Bangladesh was \$2418050000000.00 in 2018 and \$2615190000000.00 in 2019, \$2706960000000.00 in 2020. The value of Gross Domestic Product in Angola was \$ 1107640000000.00 in 2018 and it was \$1041290000000.00 in 2020. The gross domestic product had declined in many of the less developed countries in the post COVID period.
- Among developing countries, the number of COVID cases and death were higher in number in India in 2019 and 2020 with 10838843 and 155114 cases respectively. The next important country was Brazil with the COVID cases of 9524640 and death of 231561 cases respectively
- Among Developed Countries, the number of COVID cases and death were higher in United states with 67612486 covid cases and 474938 covid death cases in 2018. The death under COVID cases was 112465 in 2020 in United Kingdom.
- Among Less Developed Countries, higher number of COVID cases and death under COVID cases were noticed in Bangladesh with 538378 and 8221 respectively in the year 2020. The next important country in COVID cases and death under COVID cases was Zambia where, the number of COVID cases was 63573 and the death under COVID was 869 in 2020.

T-Test

- In developing countries, the estimated t value pertaining to Gross Domestic Product was 8.362. It was statistically significant at one percent level. It revealed that the null hypothesis of gross domestic product did not differ significantly between pre and post COVID period was rejected. It means that the gross domestic product had differed significantly between pre and post COVID period. The foreign direct investment inflow, outflow and employment did not differ significantly between pre and post COVID time period which was statistically in significant in developing countries.
- The estimated t value pertaining to e Gross Domestic Product was -61.706. It was statistically significant. The null hypothesis of gross domestic product did not differ significantly between pre and post COVID period was rejected. The foreign direct investment inflow, outflow and employment were statistically in significant. They did not differ significantly between pre and post COVID period.
- The estimated t value pertaining to Employment and Gross Domestic Product was 7.808 and 2.280. They were statistically significant at five percent level. It revealed that the null hypothesis of Gross Domestic Product and employment differed significant between pre and post COVID time period was rejected. Gross Domestic Product and Employment had differed significantly between pre and post COIVID period. Other factors were statistically in significant in less developed countries

Simple Linear Regression

- In the developed countries, the factors such as the foreign direct investment in the post COVID period, employment in the pre COVID period, COVID cases and death under COVID cases were statistically significant to determine the Gross Domestic Product. Among the above significant factors, foreign direct investment in the post COVID period had negative relationship with the gross domestic product. Increase in foreign direct investment had reduced the gross domestic product. The employment in the pre COVID period had positive relationship with the gross domestic product. Increase in COVID cases had increased the gross domestic product. The regression co efficient of cases under COVID -19 and death under COVID 19 had negative relationship with the gross domestic

product. Increase in cases under COVID cases and death under COVID 19 had reduced the Gross Domestic Product. Other factors such as Foreign Direct Investment outflow was statistically in significant.

- In the developing countries, the factors such as the foreign direct investment inflow and outflow in the pre and post COVID period, COVID cases and death under COVID cases were statistically significant to determine the Gross Domestic Product. Among the above significant factors, foreign direct investment in the post COVID period had negative relationship with the gross domestic product. Increase in foreign direct investment had reduced the gross domestic product. The foreign direct investment inflow and outflow in the pre COVID period had positive relationship with the Gross Domestic Product. Increase in the foreign direct investment inflow in the pre and post COVID period had increased the gross domestic product. The employment in the pre and post COVID period had turned out to be statistically in significant to determine the gross domestic product. The COVID cases registered and death under COVID cases were also statistically significant to determine the gross domestic product. Increase in COVID cases had reduced the gross domestic product among the developing countries.
- The results of regression analysis shows that among the selected variables, COVID-19 cases and death under COVID cases were statistically significant to determine gross domestic product of less developed countries. The estimated regression coefficient pertaining to cases under COVID cases was -0.555 which had negative relationship with gross domestic product. Increase in COVID cases had reduced the gross domestic product. The estimated regression coefficient pertaining to death under COVID cases was- 0.642. It had also negative relationship with gross domestic product. Other factors such as the foreign direct investment inflows and outflows in both pre and post COVID period were statistically in significant.

Path Analysis

- The direct relationship in the path analysis showed that the direction of relationship such as pre COVID employment was a significant factor in determining the gross domestic product in the pre COVID period. The estimated employment coefficient was negative indicating negative relationship with gross domestic product. Increase in employment had reduced the gross domestic product in the pre COVID period. The foreign direct investment inflow and outflow were statistically insignificant to determine the gross domestic product.
- In the post COVID period, the estimated path coefficients of foreign direct investment inflow, outflow, employment and COVID cases were statistically significant to influence the gross domestic product. The path coefficient of foreign direct investment inflow was negative. Increase in foreign direct investment had reduced the gross domestic product in the post COVID period. Other factors, such as foreign direct investment outflow, employment and COVID cases turned out to be positive. Increase in direct investment outflow, employment and COVID cases had increased the gross domestic product.
- In the indirect relationship of path analysis, none of the path coefficients were statistically significant. The path coefficients pertaining to foreign direct investment inflow, foreign direct investment outflow and employment were statistically insignificant.
- In the total effects, the path such as Pre COVID employment → pre-GDP, Pre GDP → post GDP, Post inflow → post GDP, post outflow → post GDP and post COVID cases → post GDP were statistically significant. Among the above path coefficients, the path coefficient pertaining to employment, pre COVID gross domestic product, post COVID inflow and COVID cases were negative. Increase in employment, pre COVID gross domestic product, post COVID inflow and COVID cases had reduced the gross domestic product. The path coefficient such as post COVID foreign direct investment outflow was positive. Increase in foreign direct investment outflow had increased gross domestic product in the post COVID period.

Conclusion

- Among developing countries, Mongolia experienced high Foreign Direct Investment inflows in both before and after COVID period. Among developed countries, Malta experienced High Foreign Direct Investment inflows in both before and after COVID period. Among Less Developed countries, Mozambique had high foreign direct investment inflow.
- Among the developing countries, the foreign direct investment outflow was higher in China in both pre and post COVID Period. Among developed countries, the foreign direct investment outflow was higher in Germany. Among Less Developed Countries Liberia had high foreign direct investment.
- Among Developing Countries, Vietnam had a high Employment Ratio in both pre and post COVID period. Among Developed Countries, Singapore had high Employment Ratio in both pre and post COVID period. Among Less Developed Countries, Zambia had high Employment Ratio in both before and after COVID period.
- Among Developing Countries, China had high Gross Domestic Product in both before and after COVID period. Among Developed Countries United States, had high Gross Domestic Product in both pre before and after COVID period. Among Less Developed Countries, Angola had high Gross Domestic Product in both before and after COVID period.
- Among Developing Countries, India had experienced high COVID cases and death cases. Among Developed Countries, United States, had experienced high COVID cases and death cases. Among Less Developed Countries, Bangladesh had experienced high COVID cases and death cases.
- In developing and developed countries, the gross domestic product had differed significantly between pre and post COVID period.
- Gross Domestic Product and Employment had differed significantly between pre and post COVID period.
- In the developed countries, among the significant factors, foreign direct investment in the post COVID period had negative relationship with the gross domestic product. Increase in foreign direct investment had reduced the gross domestic product. The employment in the pre COVID period had positive

relationship with the gross domestic product. Increase in COVID cases had reduced the gross domestic product.

- Among developing countries, the foreign direct investment inflow and outflow in the pre COVID period had positive relationship with the Gross Domestic Product. Increase in the foreign direct investment inflow in the pre and post COVID period had increased the gross domestic product. Increase in cases under COVID cases and death under COVID 19 had reduced the Gross Domestic Product.
- Among less developed countries, among the selected variables, COVID-19 cases and death under COVID cases were statistically significant to determine gross domestic product of less developed countries.
- The path analysis showed that the pre gross domestic product had its impact on post gross domestic product. The COVID cases had significant impact on Gross Domestic Product.

Suggestions

1. **Open markets and allow for FDI inflows.** Reduce restrictions on Foreign Direct Investment inflow.
2. **Set up an Investment Promotion Agency (IPA).** A successful Investment Promotion Agency could target suitable foreign investors and could then become the link between them and the domestic economy.
3. **Think carefully about sectors/activities to be targeted.** Investment and location decisions of suppliers may be dependent on those of prime multinational investors in the host economy.
4. **Put up the infrastructure required for a quality investor** such as sufficient close-by transport facilities (airport, ports), adequate and reliable supply of energy, provision of an adequately skilled workforce, facilities for the vocational training of specialised workers, ideally designed in cooperation with the investor.
5. Strengthen backward linkages from FDI into the indigenous economy.
6. Encourage spillovers from FDI into the indigenous economy.
7. Encourage first-time foreign direct investors.
8. Increase in the government expenditure on the development of infrastructural facilities which would increase the employment opportunities.

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