# International Trade and Supply Shortage with Effect of Covid 19 Pandemic: Evidence from Developing Countries

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# ABSTRACT

As the recent coronavirus (COVID-19) outbreak demonstrates, pandemics and epidemics may wreak havoc on supply chains (SC) on a global scale. Activities all around the globe were impacted by the Coronavirus pandemic, but supply chain (SC) disruptions were most noticeable. The supply chain is not likely to recover to its pre-COVID-19 state, and the effect on firms is predicted to last forever. This research looks at how the COVID-19 epidemic has affected supply chains in underdeveloped countries, including the problems it has caused, the obstacles it has presented, and the overall trend.

This thesis employs empirical analysis in the form of Pearson correlation, pooled OLS, a fixed effects model, and a random effects model to evaluate the variables that influence supply chain in the selected developing nations between the year 2015 and 2021. GDP is used as a proxy for supply chain shortfall as the dependent variable whereas the rest of the variables are used as the explanatory variables such as government debt (DEBT), total trade (TRADE2), imports of goods and services (TTRADE), and growth in the labor force (LABGROWTH). The empirical results show that debt, imports of goods and services, dummy variable and labor force have impact on economic growth whilst supply chain has no influence on economic growth.

**Keywords:** supply chain, covid-19, developing countries, disruption, manufacturing industries, pooled OLS, a fixed effects model, a random effects model.

# ÖZ

Son koronavirüs (COVID-19) salgınının gösterdiği gibi, pandemiler ve salgınlar küresel ölçekte tedarik zincirlerine (SC) zarar verebilir. Dünyanın dört bir yanındaki faaliyetler, Coronavirüs pandemisinden etkilendi, ancak en çok tedarik zinciri (SC) kesintileri göze çarpıyordu. Tedarik zincirinin COVID-19 öncesi durumuna gelmesi pek olası değil ve bunun firmalar üzerindeki etkisinin sonsuza kadar süreceği tahmin ediliyor. Bu tez, COVID-19 salgınının az gelişmiş ülkelerde tedarik zincirlerini, neden olduğu sorunlar, sunduğu engeller ve genel eğilim dahil olmak üzere nasıl etkilediğine bakıyor.

Bu tez, gelişmekte olan ülkelerde tedarik zincirini etkileyen değişkenleri değerlendirmek için Pearson korelasyonu, küçük kareler yöntemi, sabit etkiler modeli ve rastgele etkiler modeli şeklinde ampirik analiz kullanır. GSYİH, bağımlı değişken olarak tedarik zinciri açığı için kullanılırken, değişkenlerin geri kalanı, devlet borcu, toplam ticaret, mal-hizmet ithalatı ve işgücündeki büyüme değişkenler ise bağımsız değişken olarak kullanılır. Ampirik sonuçlar, borç, mal ve hizmet ithalatı ve işgücündeki büyümenin ayrıca aylak değişkenin ekonomik büyüme üzerinde etkisi olduğunu, tedarik zincirinin ise ekonomik büyüme üzerinde etkisinin olmadığını göstermektedir.

**Anahtar Kelimeler:** tedarik zinciri, covid-19, gelişmekte olan ülkeler bozulma, üretim endüstrileri, küçük kareler yöntemi, sabit etkiler modeli ve rastgele etkiler model.

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| | |
|---|---|
| DEBT | Government Debt |
| DC | Developing Countries |
| GDP | Gross Domestic Product |
| GSM | Global Supply Management |
| GSC | Global Supply Chain |
| LABGROWTH | Labor Growth |
| OSCM | Operation Supply Chain Management |
| OLS | Government Debt |
| SC | Supply Chain |
| TTRADE | Total Trade |
| TRADE2 | Total Import of Good and Service |
| WHO | World Health Organization |
| WHO | Total Import of Good and Service |

# Chapter 1

# INTRODUCTION

## 1.1 Background of Study

In economics, supply is the quantity of a resource that enterprises, directors, laborers, providers of monetary means, or other economic agents are willing and suitable to give to the trade or to an existent. Supply can be in produced goods, labor time, raw materials, or any other scarce or precious object. The supply deficit is anticipated to affect several sectors due to fear of buying, increased usage of goods to fight the epidemic, and dislocation of manufacturers and logistics all over the world. There have been instances of price overcharging. There have been broad reports of deficiencies in medicinal, with numerous sectors seeing fear buying and consequent shortages of food and other essential grocery particulars. The technology industry has been alerted about delays in shipments of electronic goods and numerous other sectors. Still, several developing countries have plodded with supply shortages in many different sectors. Especially the nutrition sector due to the high dependence on importation. In today's cutting-edge globe, national economies are intertwined in a complex web of mutual dependency. Research on the effects of supply-chain disruptions on national, regional, and international economies has been extensive. In their 18th-century classics, David Ricardo and Adam Smith theorized that commerce had a general impact on economic development, sparking a scholarly interest in the connection between the supply shortfall and economic expansion. They reasoned that commerce led to a greater

accumulation of capital and specialized advancement, both of which improved productivity, and therefore the economy grew.

The outbreak of coronavirus infection was labeled a worldwide health crisis by (WHO) towards the end of January 2020, which triggered disruptions in the global supply chain (GSC). The epidemic reached practically every country under full or partial quarantine by the middle of 2020. (McKenzie, 2020). The pandemic triggered the worst economic downturn in history, with devastating consequences for developing nations and the efficiency of operations and supply chain management (OSCM) models. The epidemic affected supply chains both at the origin and the destination. Constant ripple effects result from these jarring collisions (Ivanov 2020a; Ivanov etal. 2018; Pavlov etal. 2019b).

Although researchers have previously focused on COVID-19's effects on SCs, the epidemic's spread is expected to have widespread consequences for OSCM in the near future ( Lin etal. 2020). According to a 21 February 2020 article from Fortune (2020), 94 of the organizations on the Fortune 1000 list were experiencing SC interruptions because to the COVID-19. Deloitte (2020) highlighted that the full impact of the pandemic on SCs was yet unknown. The pandemic affected more than five million businesses with Tier 2 stock (Dun and Bradstreet, 2020). It is believed that many of the 450 million people who work in GSCs have seen their incomes drop or have lost their jobs as a direct result of the spread of COVID-19 (Kippenberg, 2020).

Because of the epidemic, the economy throughout the world has slowed dramatically. The latest evaluation by the International Monetary Fund (2020) indicates that the coronavirus epidemic has impacted economic activity in the first half of 2020 more

negatively than anticipated. Because there was still no evidence of the COVID abating in early 2021, it was likely to keep having a major detrimental impact on the international distribution network and developing countries for some time to come. Despite the many measures implemented by different governments to combat the disease, which has harmed companies and economic activity throughout the world, the global economy is expected to decrease by 5.4 percent in 2021 (from 4.9 percent in 2020).

## 1.2 Research Gap

To provide readers a complete picture of the problems supply-chain shortages cause in developing nations. Cross-country empirical information depicting the final consequences of supply chain shortages on developing countries is needed to augment the existing literature on international supply chain in these nations. This thesis goes beyond only discussing the direct impact on development in these developing nations; it also discusses the indirect effects, such as disruptions to supply chains, that the pandemic is likely to have.

More importantly, nothing is known about the reactions of developing countries (such as Mali, Afghanistan, and Pakistan) to COVID-19 or other similar pandemics. Because they have less money and must adhere to more stringent economic regulations, poor countries generally struggle to keep up with the industrialized world., it would be interesting to study how their suppliers are handling COVID-19-related difficulties. Furthermore, there is an absence of studies on how businesses have dealt with COVID-19-related interruptions to their supply chains (Butt, 2021b; Choi, 2020).

## 1.3 Research Questions

As a result, the purpose of this article is to investigate responses to COVID-19 among businesses in developing nations. This study will be guided by the following research question. Question 1: How has the spread of COVID-19 disrupted supply chains in low-income regions? Concerning the second question posed, what are the effects of supply disruptions on developing countries? To be more specific, the purpose of this research is to learn about the steps that retailers, manufacturers, and wholesalers have made to deal with the problems brought on by COVID-19.

## 1.4 Research Objective

This thesis aims to facilitate an empirical study of the factors that contribute to supply-side breakdowns in World Bank-designated developing nations. The goal of this research was to experimentally investigate the variables related to supply chain shortages which influence it. These factors consist of GDP per capita (constant LCU), Gross fixed capital formation (% of GDP), Imports of goods and services (% of GDP), Trade (% of GDP), Population growth (annual %), Population, total, Labor force total, and government debt.

## 1.5 Significant of the Study

When looking for potential causes of supply shortages in developing countries, this thesis is the first to use an empirical approach. Important consequences for future research and management of emerging nations are anticipated. Therefore, business managers and supply chain operations managers may utilize this thesis to inform their choices throughout the pandemic on how to best handle supply shortages and avoid supply disruptions.

## 1.6 Scope of the Study

This study selects 15 of the most supported developing nations. The information for 2017-2021 has been culled from the World Bank's database and is picked based on global development statements. In the end, 11 criteria were used to draw conclusions on the phenomenon under investigation.

## 1.7 Limitations of the Study

The fact that just the 15 least-restricted developing nations were included in the research is one of its major flaws. To properly compare developing and industrialized nations, it will likely be necessary to do research on all the other developing nations and all the other industrials nations. Some variables that may be impacted by the dummy variable (covid19), such as financial statements of some developing nations, population, and total labor, need familiarity with greater information. We used factors that may be estimated using the information provided by the World Bank's World Development Indicators and the World Bank's Income Statement.

## 1.8 Structure of Study

This dissertation has six individual sections. The first chapter served as an introductory look at the supply crunch that occurred during covid19 and the basics of this investigation. The second one looks to the work of previous academics for clues regarding the causes of supply constraint and the elements that contribute to it. Using an explanatory variable hypothesis and conceptual model, the third chapter discusses developing nations. The data collection, model of the research, and all estimating techniques used are described in detail in the fourth chapter, which is devoted to methodology. The fifth chapter makes some efforts to deconstruct the research design and relate the findings to the work of other academics in the field. In chapter six, the study's findings and management implications are summarized.

# Chapter 2

# LITERATURE REVIEW

## 2.1 Literature Review

Supply chain disruptions have been considerably argued in the literature and many studies, as well as mitigation strategies, have been proposed. Kleindorfer and Saad (2005) developed a frame of common exercise and mitigation strategies to attack supply chain shortages. Tang (2006) proposed many strategies to deal with supply chain shortages, including holdback, strategic stock, and a flexible supply base. Skipper and Hanna (2009) empirically proved that better inflexibility reduces the negative impacts of supply chain disruptions. Tang and Tomlin (2008) also endorse the use of inflexibility in dealing with supply chain threats. Multiple suppliers may be used to increase inflexibility in the supply chain, demand inflexibility can be fostered via holdback and price strategy, and process inflexibility can be fostered, for instance, through factories.

Chang et al. (2015) classified recurrence and inflexibility as two orders focused on their relative capacities to buffer the SC from the negative impacts of disruption. There is hope for industrial businesses that use the crisis management model developed by Rapaccini et al. (2020), which consists of four phases (disaster, quick and dirty, restart again, and adjusting, ). To reduce and recover from disruption risks, Ivanov and Dolgui (2019) investigated two important viewpoints in SCD: the ripple effect and adaptation. In order to (1) retain their introducing characteristics and assure

prosecution, and (2) be suited to acclimate in the face of approaching changes, their research demonstrated that SCs must be stable, strong, and adaptable. Worldwide sustainable production is mostly driven by global SCs. Therefore, product due diligence along global SCs may be impacted if there is an interruption in one nation. These findings add up to the conclusion that SCs throughout the world need to work together in the face of disruptions (epidemics, man-made catastrophes, and natural disasters) to survive and recover from them.

## 2.2 Supply Chain Disruption

Alteration in the Supply Chain When the usual flow of products and materials in a supply chain is interrupted due to anything beyond of the firm's control, the company is at danger of functional and financial damage (Craighead etal. 2020). Unlike the findings of Ellis et al. coverage of supply chain disruptions utilizing responsibility of shortfall and amount of shortage, Wamba's (2020) focus was on the inflexibility of interruptions. Beyond the supply chain, disruptions may have far-reaching effects (Blackhurst etal. 2005). Disruptions to supply chains can have far-reaching, negative consequences, as shown by research looking at the effects of transportation holdups and harborage closures(Chapman etal., 2003).There is a significant impact on businesses and the supply chain as a whole, according to these findings. Likewise, the difficulty of keeping a complex supply chain together is growing (Wamba, 2020). Failure is increasingly likely to occur when the supply chain becomes more complex and reliant on other parts of the system (Fan and Stevenson, 2018). Therefore, it's important to consider the risks, the importance of the supply chain, and the consequences of a disruption in the supply chain. There is widespread concern about the effects interruptions might have on supply chains, and many individuals are

searching for measures to reduce the likelihood of these problems ( El Baz and Ruel, 2021; Tu, 2018).

Since the potential for harm is higher than ever before, it is increasingly important that those in charge of the supply chain make estimates of forthcoming difficulties while keeping the potential for harm and the degree of uncertainty in mind (Ketchen etal. 2020). Researchers such as Fawcett et al. (2008), Fredericks (2005), and Swafford et al. (2006) have demonstrated that countries with high levels of inflexibility have abilities to deal with disruptions and other unanticipated events.

## 2.3 Disease Epidemics

Epidemics are considered while thinking about supply chain disruptions. In addition, they represent a specific kind of supply-chain issues identified by the following three indicators: Shortage in the structure of logistics, demand, and supply; (1) the existence of a long-term and unexpected scaling interruption; (2) the propagation of disruption in the force chain and the spread of epidemics in the population; and (3) the presence of a shortage. Epidemics, in contrast to most disruptive menaces and dangers, tend to start small but expand and spread throughout many different regions extremely quickly (He and Liu, 2015). The most important examples include MERS, SARS, Swine flu, Ebola, and the most recent one, coronavirus. The COVID- 19 pandemic began in Wuhan, China, and rapidly impacted the Chinese economy, leading to a precipitous decline in supplies throughout global supply networks. According to Araz et al. (2020), this viral epidemic's emergence is one of the most crucial disruptions in recent decades, and as a result, it is wreaking havoc on a variety of supply chains throughout the globe. When looking at previous pandemic outbreaks before the one caused by COVID- 19, you will find nothing in the way of data relating to supply chain precautions. Johanis

(2007), for instance, looks at an epidemic response strategy developed at Toronto's Pearson International Airport in the wake of the devastating impacts of the 2002–2003 SARS pandemic. The airline sector was severely impacted by this pandemic; for example, Taiwanese carriers cancelled 30 international flights (Chou etal. 2004). Still, the spread rate of the SARS contagion and China's involvement in the critical condition of SARS fully varied from that of the present COVID- 19 contagion; accordingly, SARS had smaller unfavorable impacts on the SCs. The global logistics system was also badly impacted by the rapid spread of the Ebola virus (BSI, 2014). Regarding this, Büyüktahtakn et al. Ivanov (2020) investigated how epidemics affected K. Govindan et al. In particular, he used uncertainty type features to think about the spread of the COVID-19 pandemic over worldwide networks. Concerning the approach used, both short-term and long-term effects were predicted using Any logic software. The starting and stopping times of facilities have been shown to have the greatest impact on the spread. The findings may aid decision-makers in clearing up the misunderstandings and slowing the spread.

## 2.4 Covid-19 Pandemic Consequences

The impact of COVID-19 on suppliers' networks have been the subject of much debate. Various supply chain sectors are reported to be affected by COVID-19 in the research Experimenters working in the field of demand operation often discuss the unpredictability of customer demand and the varying degrees to which different businesses can adapt to it. The spread of COVID-19 has altered customers' propensity to purchase both necessities and luxuries.

Urgent shortages developed in response to a surge in demand for necessities such as food, medication, and breathing apparatus (Paul and Chowdhury, 2020a; van Hoek,

2020). (Deaton and Deaton, 2020; van Barneveld etal. 2020). Delays in product delivery via both online and traditional distribution methods can leave consumers worried about the safety of the food they buy and other needs they need (Ivanov and Das, 2020). (Siche, 2020). Similar spikes in demand might be caused by things like panic buying, pessimism, or hoarding. One research found that a number of factors, things as anticipated dangers, fear of the unknown, behavioral imitation, and other social internal components, all contributed to fear-based purchases being similar (Yuen etal., 2020). Researchers in one research concluded that suppressing information that may make buyers reluctant to buy was the best course of action (Zhu and Krikke, 2020). Demand for worthless products has also declined as individuals strive to conserve their cash and prepare for future ambiguity ( (Abhishek etal. 2020; Chiaramonti and Maniatis, 2020. Aerospace, tourism, oil, gas, and the clothing industry are just few of the many that have weathered this unprecedented disaster (Majumdar etal. 2020). Uncertainty and fuzziness are introduced into the supply network, which impacts forecasting and decision-making due to the unexpected shift in demand (Genesee and Subramanian, 2020). The value of the goods is also impacted. The value of non-essential goods has decreased while the value of necessities has risen (Farias and Arajo, 2020. Governments throughout the world have implemented supply system lockdowns, limiting vehicle movements to reduce the spread of the disease. These and other limitations have primarily limited the ability of suppliers to meet consumers' demands for timely product deliveries (Ivanov and Das, 2020). In today's highly interconnected global economy, businesses may find supplies almost anywhere in the globe. Whether or whether a company's primary suppliers are based in the country, its secondary and tertiary vendors are almost certainly not. In addition, various regulatory actions, to maintain social isolation in the workplace, such as

cutting office hours and forcing individuals work on crucial days, have reduced the businesses' assembly capacity (Leite etal. 2020). Because of these safety precautions and the ensuing alienation from coworkers, employees are unable to work full time (Trautrims et al. In addition, the plant's reduced output led to the premature failure and depreciation of its capital equipment and assets (Dente and Hashimoto, 2020). Because of the limitations placed on the movement of vehicles, the transportation and logistics industries have had to dismantle a number of various forms of transportation (Gray, 2020). Holdups have been made, and the smooth flow of goods has been hampered, all because of transportation (Deaton and Deaton, 2020). The logistics and distribution landscape is continuously evolving. Before the outbreak, many poor countries relied mostly on offline distribution channels, but now many have gone totally online or adopted a hybrid online/offline strategy. The COVID-19 pandemic has also affected the efficiency of supply chain connections. One research reveals the narrow scope of interpersonal connections between firms in the supply chain (Baveja etal. 2020). As a result of this deterioration in interpersonal connections, there is a greater chance of information ambiguity, vagueness, and incompleteness (Gunessee and Subramanian, 2020). And because of this, fewer suppliers are actively participating in the process, making it more challenging for businesses to adopt a cooperative strategy that takes into account the needs of all relevant stakeholders (van Hoek, 2020). Providers may raise prices if they notice that other suppliers are struggling because of interruptions, as stated by Gupta et al. (2020). Many of the effects discussed in the research are not limited to any one element of the supply chain but rather have everything to do with supply chain management. In a supply chain, all of the functions are interdependent on one another's functioning, so any interruption to any one of them may have far-reaching consequences (Gunessee and Subramanian, 2020 b). Based on these results,

it seems that the failure of a single member to serve effectively may disrupt the whole operation (Queiroz etal. 2020). A complete breakdown of supply chain operations is possible if measures aren't taken to address the effects on consumption, supplier, production, transit, logistics, and interpersonal connections. Two studies have examined the sensitivity of these losses to varying factors such the kind and duration of restriction measures (Guan et al., 2020). The data show that the length of shutdown or limitation measures, as well as the number of countries that implement them, are more essential than their strictness in influencing the extent of financial losses (Guan etal. 2020). When facilities close and when they reopen at various points in a supply chain may have a significant impact on the magnitude of losses (Ivanov, 2020a). The worldwide GDP is predicted to fall by 12.6% in 2020 as a consequence of comparable performance decreases; this loss might increase to 26.8% due to the global shutdown (Guan etal. 2020). Finally, there would be a significant rise in recyclable materials and products due to the consequences indicated in the articles, which are related to transportation and labor difficulties. If the ship-breaking industry were to produce all of the recyclable material projected over the upcoming five years at a cost of approximately $ 20 billion, Rahman et al. (2021) estimates that the cost to society would be closer to $ 30 billion. Many of the research we looked at also agreed that these effects are likely to endure for a long time, thus, we will hereafter use such references. Furthermore, Gunessee and Subramanian (2020) argue for strengthened solutions for resilience by stating that the pandemic impacted almost the majority of supply chain network.

## 2.5 Adaptation Strategies

Prior to the COVID-19 pandemic, researchers studying supply chain resilience solutions typically focused on a single disruption script, such that used in supplier selection (Golan etal. 2020). However, the "unknowns" of an epidemic like the present COVID- 19 issue were not addressed in these experiments, so we don't know, for instance, how the effects of a damaged node may ripple across the rest of the network. Due to this, supply networks lack the adaptability they need. Several research have proposed several responses to the present vulnerability, including ways to recover from the current pandemic, as well as ways to prepare for future outbreaks like COVID-19. We established connections between the various approaches given by closely evaluating the arguments presented in these publications. As a result, we gave special attention to the three most important features of supply chain resilience: prevention, mitigation, and recovery. Having a plan in place that supports supply chain participants in taking immediate action to mitigate damage is one measure of preparedness, while having a plan that helps in restoring the supply chain to normal operations is another measure of recovery success (Chowdhury and Quaddus, 2016).

Table 1 : Presents a summary of the many options for adaptability that were discussed in the articles we read, classifying each strategy according to three limitations of supply network adaption it aimed to address.

Planning for the future: adaptability measures to mitigate the effects of the recent pandemic.

| Resilience strategy | Resilience dimensions | Preparedness | References |
|---|---|---|---|
| early production increase | | ✓ | Lozano-Diez et al. (2020); Mehrotra et al. (2020; Veselovská (2020) |
| larger output capacity | | ✓ | Leite et al. (2020); Paul and Chowdhury (2020a) |
| Increasing capacity temporarily | | ✓ | Leite et al. (2020) |
| Systems for distributed manufacturing | | ✓ | Shokrani et al. (2020) |
| Changing the properties of the product (e.g. theirbasic quality and size) | | ✓ | Paul and Chowdhury (2020b); Veselovská (2020) |
| Custom or redesigned emergency production items | | ✓ | Rowan and Laffey (2020); Shokrani et al. (2020); Okorie et al.(2020) |
| Maintaining/improving transportation capability | | ✓ | Abhishek et al. (2020); Baveja et al. (2020); Deaton and Deaton(2020); Gray (2020) |
| sharing supplies | | ✓ | Mehrotra et al. (2020), |
| Increasing awareness through supply network mapping | | ✓ | Ivanov and Das (2020); Sharma et al. (2020a); Singh et al. (2020); |
| Emergency sourcing | | ✓ | Paul and Chowdhury (2020a, 2020b) |
| achieving equilibrium between internal output and trading abroad | | ✓ | Deaton and Deaton (2020); Handfield et al. (2020); Sharma et al. (2020a); van Hoek (2020) |
| Utilization of home delivery, mobile (flexible) services, and online sales | | ✓ | Choi (2020a); Gray (2020); Gurbuz and Ozkan (2020); Ibn- |
| the utilization of intelligent communication channels and information technologies | | ✓ | Choi (2020a); Gurbuz and Ozkan (2020); Ibn-Mohammed et al. (2020) |

There have been widespread reports of food and medicine shortages due to the current pandemic. Multiple solutions have been proposed in the literature to lessen the effects of this issue and guarantee the supply of vital supplies. Many studies (Lozano- Diez et al. 2020; Mehrotra et al. 2020; Veselovsk'a, 2020), for example, recommend boosting output ahead of time via making snap choices in order to reduce deficits. To this end, weighing the costs and advantages of various production-boost windows is essential (Mehrotra etal. 2020. Supply chains may also reallocate resources from less important

industries and employ academics and retirees to speed up their response (Leite etal. 2020). It's probable that the supply networks would need to increase production. For the short-term nature of demand surges brought on by epidemics, researchers have advocated leveraging dispersed manufacturing systems and constructing temporary capabilities by eliminating wasteful activities (Leite et al., 2020). ( Shokrani etal., 2020). Since the need for services from the numerous enterprises participating in the supply chain will peak at different periods, resource sharing across these commodities has been proposed as a strategy to mitigate the consequences of this extraordinary disruption and reestablish regular operations (Mehrotra etal. 2020). If there is a shortage of raw resources, increasing output is neither feasible nor desirable. According to Paul and Chowdhury's (2020) research, an Australian manufacturer of hand sanitizer ran out of key ingredients and had to halt manufacturing. Several research have proposed techniques for bolstering upstream resilience as a reaction to these kinds of problems. Ivanov & Dolgui (2020), for instance, suggested increasing transparency by mapping supply networks to foresee the impact of interruptions. Useful in developing node/supplier-specific strategies, this mapping may be a great resource. Another piece of advice for supply chains is to spread out their suppliers across several regions to reduce the risk of production delays while one position is on lockdown (van Hoek, 2020). Logistics and supply chain restructuring initiatives have been promoted as a means of both mitigating the short-run impact of pandemic and laying the groundwork for a more flexible supply chain in the long-term. Studies have advised domestic or back shoring manufacturing options to boost local capacities for coping with the pandemic outbreak (Cappelli & Cini, 2020; Deaton & Deaton, 2020; van Hoek, 2020). In the years leading up to COVID-19, several companies sought to reduce their operating expenses by setting up offshore facilities in developing nations.

However, the spread of COVID19 demonstrates the difficulties inherent in coordinating the distribution of goods from different regions in the midst of a pandemic.

As a result, organizations that want to outsource goods still need to find a middle ground between local manufacturing and international commerce in order to lessen their exposure to risk (Deaton and Deaton, 2020). Various research have advocated for improving supply chain IT competence. Consumers increasingly prefer having services brought to their homes, which has led to a rise in the fissionability and needs of mobile services (Choi, 2020a; Richards and Rickard, 2020). Therefore, companies should provide more customer-friendly options, such as smartphone access to their services, online discounts, and even home delivery. The same holds true for the supply chain as a whole; digitalization and the use of IT are necessary to integrate all links and lessen the impact of interruptions (Ibn- Mohammed et.al., 2021; van Hoek, 2020). Also, as a preventative measure, it is recommended that stores use contactless payment systems (Mollenkopf et.al., 2020). Furthermore, Deaton & Deaton (2020) suggested relaxing capital inflow to address the shortage of capital needed to restructure the supply chain and digitalization. Supply networks may be made less vulnerable to external interruptions with the use of proactive and adaptable solutions (Ivanov and Das, 2020). As a common economic approach for controlling demand decline, Chiaramonti and Maniatis (2020) recommended companies to lower prices on goods, focusing on those with low demand. The need for help from stakeholders like NGOs and the government to assist associations in dealing with the effects of the COVID- 19 outbreak has been acknowledged by multiple studies (Choi, 2020a; Kumar etal. 2020;

Majumdar etal. 2020), and this has prompted advocates for assistance and subvention schemes among researchers.

## 2.6 Resilience of Supply Systems in the Face of the Pandemic

The present pandemic has had a disproportionately negative effect on the sustainability movement. Many articles we read presented contrasting arguments for and against the same sustainable development-related points of view. To assess a project's long-term feasibility, some of these studies included non-economic variables such as job losses and health and safety concerns. The impact of the epidemic on the labor market (van Barneveld etal., 2020), the risk of ultramodern slavery (Trautrims, 2019), and so on all need to be addressed ( Jabour etal., 2020; Queiroz etal., 2020).Several additional researches pondered environmental sustainability concerns in light of the present pandemic. Some of them include rolling back efforts to use renewable and low-carbon energy origin. drug manufacturing's growing environmental toll as epidemics spread (Yu et. al., 2020). growth in medical and food waste; effects on waste overflows, resource consumption, and air pollution; implementation of environmental sustainability initiatives; recyclability of end- of- life items; Rahman et al. 2021. (Sharma etal., 2020b). Since post-COVID-19 trends suggest that companies and the general people would be more dedicated to sustainability than they were before the epidemic, some scholars have speculated that the pandemic would have some positive and negative effect on sustainability of environment. The reduction in pollution, energy consumption, and carbon dioxide emissions is only one of the many positive outcomes for the environment.

Table 2: Illustrates various aspects and problems of supply chain resilience have been thought through the pandemic in the articles we analyzed.

Dimensions and issues of sustainability vis-à-vis the COVID-19 pandemic.

| Reference | Dimension of sustainability | | |
|---|---|---|---|
| | Economic issues | Environmental issues | Social issues |
| Hakovirta and Denuwara (2020) | – | – | Issues in health and safety, domestic violence, job loss, economic inequality |
| Hosseini (2020) | Decrease in price of gas fuel | Damaging the trend of green energy, damaging the low carbon energy progress | – |
| Yu et al. (2020) | – | Increase in environmental pollution due to increasing production of pharmaceutical products | – |
| Dente and Hashimoto (2020) | Increase in storage costs | Reduction in air pollution and energy consumption, increase in household waste, decrease in industrial waste | Increase in social innovation |
| Sarkis et al. (2020) | Slowdown in economic activity | Reduction in greenhouse-gas emissions and air pollution, | – |
| Amankwah-Amoah (2020a) | – | Offsetting carbon emission footprint, environment-friendly practices | – |
| Jabbour et al. (2020) | Lack of sharing economy | – | Issues in health and safety |
| Queiroz et al. (2020) | Increase in supply chain costs | Impacts on climate change | |
| van Barneveld et al. (2020) | Stock market collapse | Reduction in oil consumption and pollution | Socio-economic inequality, health inequality, increased job loss for women |
| Trautrims et al. (2020) | – | – | Modern slavery risk, job loss |
| Majumdar et al. (2020) | – | – | Violation in code of conducts of social compliance, lack of social security |
| Rahman et al. (2021) | – | Inability to recycle end of life ships, lack of circular economy practices. | – |
| Sharma et al. (2020b) | – | Increase in medical, plastic and food waste. Increase in single-use plastic bags. | Health and safety issues |
| Sharma et al. (2020c) | Supply chain practices for cost reduction | Utilization of resource, recycling and waste management | Compliance of labor laws and social standards |
| Kargar et al. (2020) | How to minimize total cost in supply chain | How to minimize uncollected medical waste. Importance of waste treatment. | – |
| Ibn-Mohammed et al. (2021) | Global economic shock | Improvement in air quality, reduction in environmental noise, low carbon-di-oxide emission, decline in energy use. | Job loss, socio-economic inequality |
| Sharma et al. (2020a) | – | Greenhouse gas emission in supply chain | Issues in health and safety of employees across the supply chain |

## 2.7 Related Concepts

Strategies for addressing the difficulties of an epidemic may emerge from several theoretical contexts (Craighead etal. 2020). One research project develops an epidemic action plan according to the principles of the hypothesis of constraint (Baveja etal., 2020). In another study, the digital binary required for disruption management is designed using dynamic system theory as a guiding concept. One other piece (Ivanov, 2020b) makes use of the data control and information hypothesis to clarify the connections between flexibility and long-term success. Mollenkopf et al. (2020) developed a supply chain reaction strategy to the present food extreme using a service-

dominant sense paradigm to provide value for customers. To learn how businesses deal with and form judgments about uncertain occurrences like the COVID- 19 pandemic, the behavioral choice hypothesis is used (Gunessee and Subramanian, 2020). However, several research advocate for theoretically informed investigation. Craighead et al. (2020) recommend that researchers and managers examine supply chain issues like COVID-19 via theoretical lenses. Some of the well-established theories they discuss and how they can be applied include: (i) the consciousness frame, (ii) the incident system design hypothesis, (iii) the game theory, (iv) the organizational assumption, (v) the contender theory, (vi) the risk based hypothesis, (vii) the resource - based hypothesis, (viii) the resource unity hypothesis, (ix) the conceptual inertia hypothesis, and (x) the event hypothesis. According to the findings of Ketchen and Craighead (2020), the resource unity theory should be applied to the upcoming COVID- 19 pandemic exploration. This approach could reveal how specific tools could be stationed to enhance diverse capabilities, similar to online distributions, and how similar deployment may affect performance during the disruption. Queiroz et al (2020) further encourage scientists to test operational exploration/management hypotheses such as the network theory, complexity hypothesis, graph hypothesis, and systems dynamics proposition, as well as empirical theories such as the contingency hypothesis, resource/knowledge-based views, dynamic capabilities models, and information processing theory.

# Chapter 3

# SUPPLY SHORTAGE ON DEVELOPPING COUNTRIES

## 3.1 A Brief Background

Following the disastrous decade of the 1980s, developing countries gradually integrated into the global supply chain, leading to an uptick in international commerce in the late 1990s and early 2000s. From the 1990s until the Great Recession of 2008, developing nations were responsible for an annual rise of 11 percent in total global commerce. Economic analysts dissect this number and find that at a time when developing markets were putting global commerce to the test, just 7% of global growth came from wealthy nations. The result was a significant increase in developing-world demand in the late 1990s and early 2000s (Graph 1). The developing world's percentage of the market went from less than 30 percent in the early 1990s to about 50 percent in 2021, mirroring the upward trend in products. While they only made up less than 20% of international commerce in the 1990s, emerging nations accounted for over a third of worldwide trade in 2017. However, since 2012, both service supply and exportable items from these emerging nations have slowed significantly. Since then, emerging economies have adopted trading practices that are strikingly similar to those of developed nations.

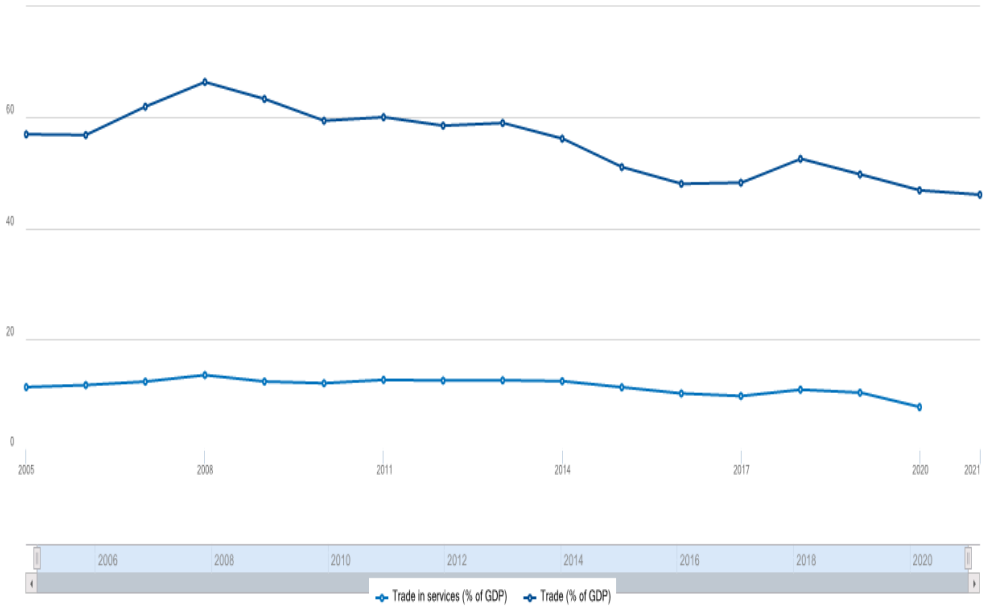



Figure 1: Share of developing countries in world supply (percentage of GDP)

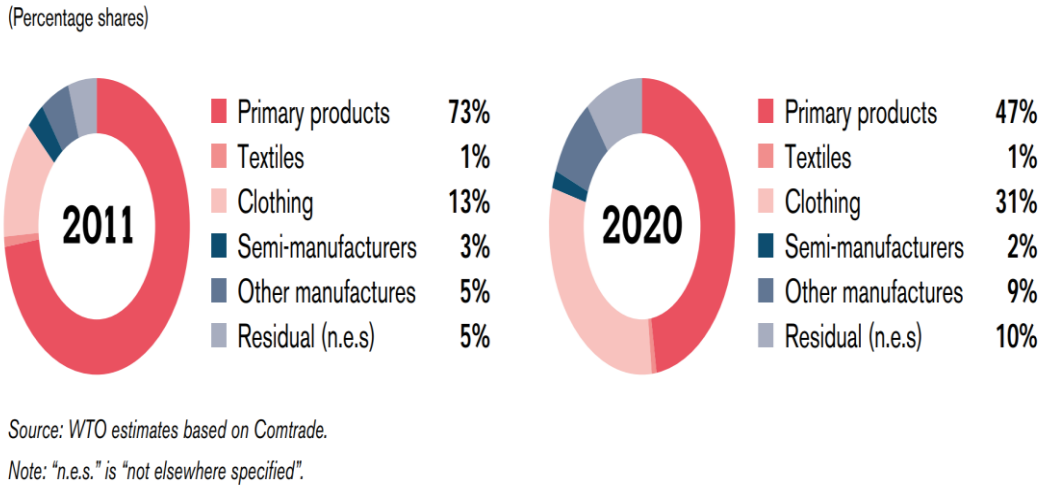
To provide people an accurate picture of the impact of supply shortages in developing nations. We will provide worldwide empirical research that illustrates the final consequences of international trade on emerging nations. Besides the obvious impact on the already-existing supply-and-demand imbalances in these developing countries, this issue has a secondary but no less important consequence. In this part, we'll go deeper to illustrate the role that emerging countries play in the global supply chain via topics like education, financial development, and governance, using both graphical and tabular representations.

## 3.2 Properties in Tables and Graphs


*Source: Estimates by the WTO and the United Nations Conference on Trade and Development (UNCTAD).*

Figure 2: Developing countries shares in world exports, 2011-2020

Exports in DC only rose by 0.2%, less than half the rate of growth (0.2 per cent). The fluctuating cost of essential materials is a major factor in this phenomenon. Due to gasoline costs being almost half what they were in 2011, oil exporting DCs had negative yearly export growth between 2011 and 2020. The worldwide economic slowdown brought on by the COVID-19 epidemic contributed to the already-high volatility of pricing for basic commodities. It is a problem for many developing countries to consistently run a trade deficit. The imbalance in DCs' merchandise trade has increased by a factor of five between 2011 and 2019. A rise in the demand for goods that aren't manufactured in many DCs is a direct result of the region's economic development. More importantly, many DCs cannot diversify their exports beyond key commodities. Their trade imbalance has widened as a result of a number of these causes.

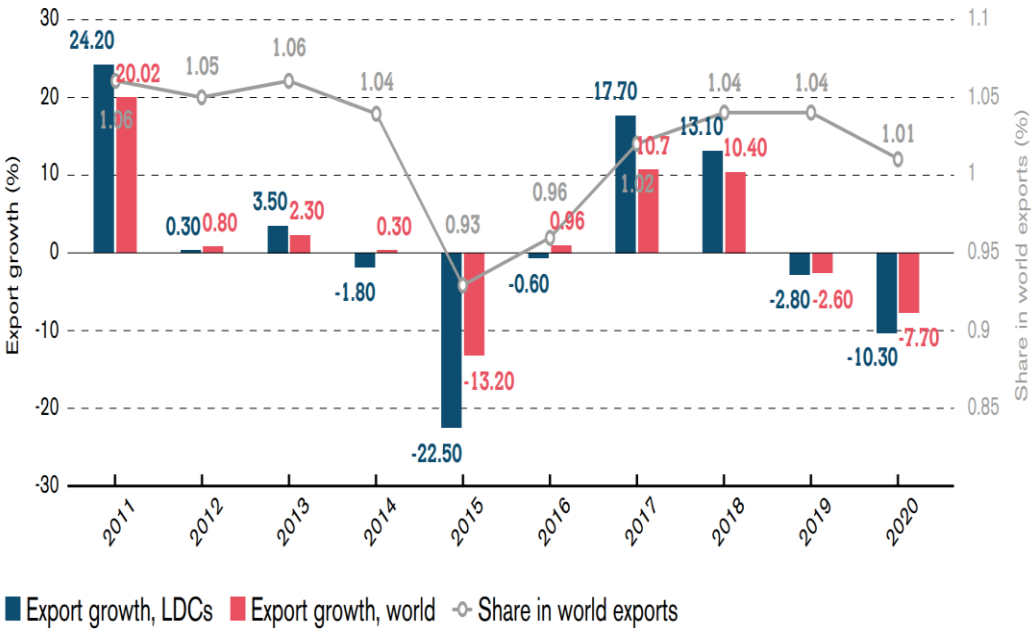



*Source: WTO estimates based on Comtrade.*

*Note: "n.e.s." is "not elsewhere specified".*

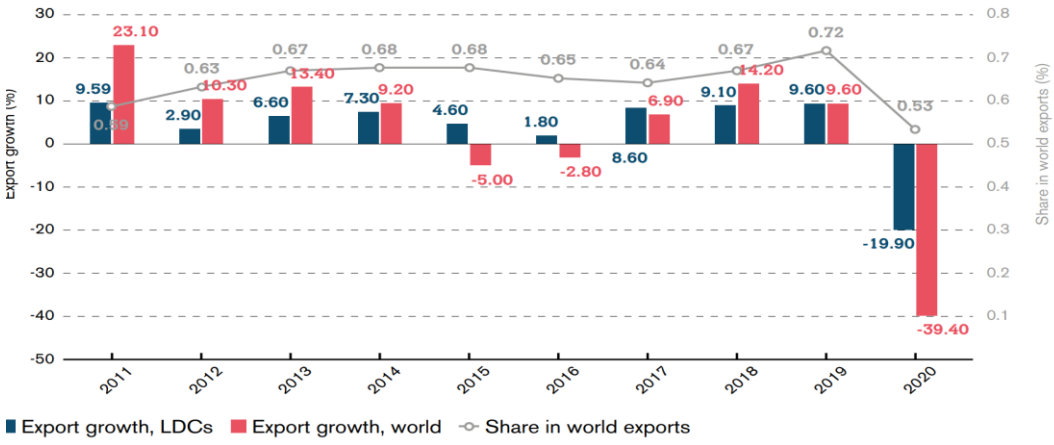
Figure 3: Changes in developing countries' merchandise exports between 2011 and 2019

The export structure of DCs has changed significantly over the last decade, with a steady decline in basic items due to falling oil prices and a rise in manufactured goods due to the increasing proportion of clothing exported. Even though the rest of the world exports 66% more manufactured products than DCs do, 40% of DCs' total exports are made up of such items.




*Source: WTO-UNCTAD estimates.*

Figure 4: Rates of growth in merchandise exports and the proportion of global exports handled by DCs




*Source: WTO-UNCTAD estimates in cooperation with the International Trade Centre (ITC) and the United Nations Statistics Division (UNSD).*

Figure 5 : Developing economies' rising export proportion and the rise of commercial services

Exports of commercial services from DCs grew annually by 6.8 percent between 2011 and 2019, increasing their global market share from 0.59 percent to 0.72 percent. There has not been any noticeable improvement despite the limited supplies. By 2020, DCs had seen a precipitous decline in their services exports—40%, or twice as much as the global decline. Down from 0.6 percent in 2011, DCs' share in global commercial

services exports was a meager 0.53 percent in 2020. (see Figure 5). More than half of a country's total exports may come from services for certain nations like Comoros, Ethiopia, and The Gambia. Some developing countries have made significant strides in exporting high-end services like banking, IT, and professional consulting, but the vast majority of DCs still rely on tourism and business travel as their core service exports. As a result, COVID-19 has had a disproportionately negative impact on DC's services exports. As a result of lockdowns and other disruptions to international travel, exports of tourism services fell by 88% year-over-year in the second quarter of 2020, and they hardly recovered in the third and fourth quarters. Building DCs' supply capacity for services is crucial for diversifying their economies, even though the shock generated by COVID-19 to service export demand is likely transient.

## 3.3 Brief Summary

As DCs attempt to join the global trading community, new obstacles have arisen. With the COVID-19 epidemic, e-commerce and the shift to a digital economy have gained significant momentum. The digital gap between DCs and the rest of the country has to be closed. At various times, the DCs have stressed the need of a solid ICT infrastructure or support for legal and regulatory frameworks. If DCs are going to take advantage of new possibilities, they must have access to the appropriate digital technologies.

Better human, institutional, and supply-side capabilities will be needed in the next decade to facilitate DCs' qualitative integration into global commerce. DCs' trading capabilities will continue to improve thanks to aid from the Aid for Trade program. Yet, in the next years, the continuing epidemic may affect the breadth and variety of the Aid supply chain to DCs. The EIF helps developing countries strengthen their

infrastructure and increase their output. The international community should prioritize addressing the requirements of DCs in terms of strengthening their supply chain capabilities. This includes exploring ways to improve the efficacy and efficiency of aid for the supply network. Considering DCs allows us to assess the areas where foreign aid is lacking, as well as to pinpoint the true challenges that DCs confront. With the current COVID-19 epidemic, it is crucial that DCs have quick and easy access to lifesaving vaccinations and medicines that may help the economy recover.

However, in order to significantly impact DCs' supply performance over the next decade and their favorable integration into the global economy, medium- to long-term policies backed by corresponding actions are essential. The multilateral trade system is founded on rules, and the international community should work to enhance it so that it can continue to sustain stability and prosperity.

# Chapter 4

# DATA, MODEL AND METHODOLOGY

## 4.1 Data Collection

In this thesis, the World Bank database provided the foundation for most of the research. Widely regarded as one of the most comprehensive collections of international economic, financial, and social variables available. Fifteen of the most heavily supported developing nations from 2015 to 2021 have been selected for this analysis. Furthermore, 15 developing countries were left out due to a lack of data for those nations and for certain time periods.

## 4.2 Measurement of Variables

GDP has been employed as the dependent variable in this analysis. Contrarily, capital, trade, population growth, debt, and total import have all been treated as separate factors. All of the aforementioned factors are analyzed using both financial statements and global development indicators.

The accompanying table (Table 3) displays the effects of the many factors used in this investigation. Each variable's name, its abbreviation, and its references are shown in the first, second, and third columns, respectively.

Table 3: An overview of the variable

| VARIABLE NAME | ABREVIATION | REFERENCES |
|---|---|---|
| Gross domestic Product Constant | GDPPCO | data.worldbank.org |
| Gross Fixed Capital Formation | KAPITAL | data.worldbank.org |
| Trade | TTRADE | data.worldbank.org |
| Total Import | TRADE2 | data.worldbank.org |
| Labor Growth | LABGROWTH | data.worldbank.org |
| Government Debt | DEBT | data.worldbank.org |
| DUMCOVID19 | Dummy | By author |

## 4.3 Definition of the Model

Both endogenous and exogenous variables have been selected as candidates for this study's six variables to discover the factors that impact supply shortfall in emerging nations. The effects of CAPTAL, TTRADE, DEBT, LABGROWTH, and TRADE2 on GDP have already been highlighted. The conceptual frameworks presented here will be used in our investigation (Jouini, J. 2015).

The following model will be conducted in the following form:

$$Y_{it} = \alpha_i + \lambda_i Y_{it-1} + \sum_{p=1}^{k} \beta_{pi} X_{it}^{p} + \gamma_{1i} trade_{it} + \gamma_{2i} trade_{it}^{2} + \varepsilon_{it} \quad (1)$$

Where,

The GDP per capita of country I at time t is denoted by $Y_{it}$, where X is a vector whose components include investment rate, labor growth rate, education, crisis, financial development, and debts; trade is the supply of developing countries; i reflects the specific effects of country, t is the time and e is an error term.

## 4.4 Data Analysis

Initially, this research performed a correlation analysis to determine whether or not certain variables are correlated with one another. The hypotheses were then put to the test via the use of regression analysis. The hypotheses have been tested by fixed effect and random effect analysis.

## 4.5 Regression Analysis

To recap, this thesis employs a linear model. Using a collection of statistical data on the dependent and independent variables, the author has attempted to estimate the parameters of the linear equation (Weisberg, 2005, p. 36). If there is no mistake (ui = 0), finding the parameters' values is trivial. Issues, however, are seldom that straightforward, since the error term (u) is always there due to the following reasons: The model is corrected by subbing in missing variables (Brooks, 2014, p. 78). Problems with measurement (Try to quantify both the independent and dependent variables) (Gujarati & Porter, 2009, p. 56). One restriction is that the dependent variable must be randomly chosen (Gujarati & Porter, 2009, p. 57).

Since a perfect mathematical solution is impossible, approximations must be used while determining the values of the parameters (Brooks, 2014, p. 41). Parameter estimate I may be accomplished in several ways. In this thesis, I have used OLS, fixed, and random effects models.

## 4.6 Ordinaries Least Square

The Ordinary Least Squares (OLS) method of parameter evaluation was developed by Carl Friedrich Gauss, a German mathematician of the 18th century (Deakin, 2015). OLS is based on creating points in the coordinate plane that are related to the sample, also having the line go through the center of the point that is the shortest distance from

these points (according to predetermined criteria), as stated by Gujarati and Porter (2009, p.61). According to this approximation, with the square of the residual distance from the best-fit line being equal to the total sum of squares (Brooks, 2014, p. 85).

## 4.7 Fixed Effects Model

This technique of estimate looked for differences in the intercept to investigate precisely (Greene, Han, & Schmidt, 2002). By enabling each person to choose their own cut off value, we can examine the precise difference in the intercepts. Even if the values of the intercepts may vary across various entities, the coefficients of the slopes remain constant. Additionally, the error component is related to other regressors, and the effect of each person remains constant throughout time (Wang & Ho, 2010).

## 4.8 Random Effects Model

The error variance is computed across sets or periods in the random effects estimation model, which also assumes that no causal relationship exists between the individual effect and the dependent variables. In this method, the intercepts, and slopes of the regressors are held constant across subjects, and any inter- and intra-subject differences are shown instead in the form of explicit errors at the individual level. The random effect model has another name, the error components model, because of this (Brooks, 2014, p. 536). Although the random effect model will reduce the total number of estimated parameters, If the random effects of the regressors are known, the estimates will be off (Greene H., 2008, p. 201).

# Chapter 5

# EMPIRICAL RESULTS

## 5.1 Correlation Analysis

The purpose of this analysis is to measure the relationship between GDP cons and CAPITAL, TTRADE, DEBT, LABGROWTH, and TRADE2. Table 4 displays the relationship between these factors through Pearson correlation coefficients.

Table 4: Matrix of correlations

| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| (1)GDPPcons | 1.000 | | | | | |
| (2) kapital | 0.337 | 1.000 | | | | |
| (3) ttrade | 0.405 | 0.402 | 1.000 | | | |
| (4) trade2 | 0.356 | 0.221 | 0.353 | 1.000 | | |
| (5) debttt | -0.339 | 0.093 | 0.388 | -0.143 | 1.000 | |
| (6) labgrowth | -0.281 | 0.053 | -0.049 | -0.212 | 0.152 | 1.000 |

It is worth emphasizing that we expect to have low correlation between the explanatory variables and high correlation between the depend variable (GDP) and the explanatory variables (KAPITAL, TTRADE, TRADE2, DEBT, LABGROWTH, and DUMCOVID19).

Therefore, the correlation matrix shows that the link between GDP and the independent variables are moderately fine. The signs between the relevant variables are found based on the theory. This analysis also provides future evidence for the next analyses.

Moreover, in their study, Daim and Ozbilgin (2019) examined the relationship between capital structure and firm performance in emerging economies. They found that the optimal capital structure varies depending on the economic environment of the country, and that a higher level of debt can lead to higher firm performance in certain contexts. This is consistent with the positive coefficient for debttt in the linear regression model presented.

Additionally, the authors also found that the relationship between capital structure and firm performance is influenced by a variety of factors, including firm size, profitability, and industry. This suggests that the impact of capital structure on firm performance is complex and context-dependent, which highlights the need for further research in this area.

## 5.2 OLS Result

The findings of an OLS regression model used to determine the relationship between the dependent and independent variables are shown in Table 5. With these significant percentage 90%, 95%, and 99.9%, the corresponding critical values from the t-test table are 1.645%, 1.967%, and 2.5766%. (Gujarati & Porter, 2009, p. 879).

Table 5**:** Ordinary least square result

**Linear regression**

| GDPPcons | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|---|---|---|---|---|---|---|---|
| kapital | .241 | .123 | 1.96 | .054 | -.005 | .486 | * |
| ttrade | .615 | .129 | 4.78 | 0 | .359 | .871 | *** |
| trade2 | 0 | .003 | 0.18 | .856 | -.005 | .006 | |
| debttt | -.804 | .149 | -5.40 | 0 | -1.101 | -.507 | *** |
| labgrowth | -.165 | .08 | -2.07 | .042 | -.324 | -.006 | ** |
| Constant | 15.883 | 3.977 | 3.99 | 0 | 7.95 | 23.816 | *** |

| | | | |
|---|---|---|---|
| Mean dependent var | 24.600 | SD dependent var | 19.604 |
| R-squared | 0.509 | Number of obs | 75.000 |
| F-test | 14.287 | Prob > F | 0.000 |
| Akaike crit. (AIC) | 616.894 | Bayesian crit. (BIC) | 630.799 |

*** *p*<.01, ** *p*<.05, * *p*<.1

The results in table 5 indicate that all variables such as government debt (DEBT), total trade (TRADE2), imports of goods and services (TTRADE), and growth in the labor force (LABGROWTH). The empirical results show that debt, imports of goods and services, and growth in the labor force have an impact on economic growth whilst supply chain (TRADE2) has no influence on economic growth. It is important to mention that Dummy variable for Covid 19 were found to be significant. This also confirms the results why supply chain has no influence on economic growth.

The findings of Daim and Ozbilgin suggest that firms with higher capital structure have better financial performance, which supports the notion that investment in capital leads to increased consumption and economic growth.

It is also worth noting that the negative coefficient for debttt in the model is consistent with the findings of a study by Mendoza and Terrones (2008) which found that high levels of debt can lead to financial instability and economic downturns.

## 5.3 Fixed and Random Effect Model

Table 6: OLS Poll-OLS random effect and fixed effect results

OLS Poll-OLS Random Effect and Fixed effect results

| Variable | OLS | Pool OLS | FE | RE |
|---|---|---|---|---|
| kapital | .24089681* | .24089681 | .09806854 | .24089681* |
| ttrade | .61503057*** | .61503057*** | .46425318*** | .61503057*** |
| trade2 | .00046598 | .00046598 | -.00139335 | .00046598 |
| debttt | -.80377076*** | -.80377076*** | -.75105204*** | -.80377076*** |
| labgrowth | -.16497742** | -.16497742** | -.17151138** | -.16497742** |
| _cons | 15.883112*** | 15.883112*** | 21.812553*** | 15.883112*** |

F(5, 69) = 14.29

R-squared = 0.5087

Adj R-squared = 0.4731

legend: * p<.1; ** p<.05; *** p<.01

In Table 6, the results of fixed effects and random effects are displayed. Pool OLS and Fixed effect estimates provide the same results whereas TTRADE2 (supply chain) and KAPITAL are not significant, so the variables have no impact on economic growth. In the same table, TTRADE2 (supply chain) has no significant effect by conducting OLS and Random effect models. It is important to underline that DUMCOVID19 was constructed as a step dummy variable which contains the influence of covid 19 period. Overall, supply chain was not found significant in every single model that applied within this thesis. On the contrary, dummy variable used for the models has significant impact on economic growth over the year between 2015 and 2021.

The results of the regression analysis suggest that capital, trade, and debt are significant determinants of consumption, while labor force growth has a negative effect on consumption. These findings are consistent with previous research on the topic.

Abosedra and Baghestani (1989) examined the determinants of consumption in the US and found that capital and international trade were important factors affecting consumption. The authors argued that the higher the level of capital investment in the economy, the higher the level of consumption. They also found that international trade positively affects consumption, as it leads to an increase in the availability of goods and services.

Similarly, Bohn (1994) investigated the relationship between consumption and debt in the US and found that debt has a positive effect on consumption. The author argued that consumers are more likely to spend money when they have access to credit, which allows them to purchase goods and services that they would not be able to afford otherwise.

On the other hand, Lee (1995) explored the determinants of consumption in Korea and found that labor force growth has a negative effect on consumption. The author argued that as the labor force grows, income is spread more thinly across the population, leading to a decrease in consumption. This is because people have less disposable income to spend on goods and services.

# Chapter 6

# CONCLUSION AND RECOMMADATION

## 6.1 Conclusion

International commerce and business were severely hampered by the COVID-19 pandemic, which had a profound effect on SCs. The shutdown of production and the interruption of SC. had a significant impact on many firms, who were already struggling to keep up with demand and get sufficient supplies. Almost every business had SC difficulties because of the outbreak. Coping with a pandemic like the one caused by COVID-19 may make it harder to prepare for catastrophes. Emergencies requiring SC require snap decisions in a complicated and high-stakes environment because to the high price and low quality of SC. The aftermath isn't expected to go away anytime soon. It is likely to continue to have a significant impact on commercial practices for the foreseeable future. SCs will look different after COVID-19. Most GSCs were disturbed by the shocks and economic impacts of the crisis. The pandemic has far-reaching effects on SCs and their management in a variety of important ways. Many companies keep an eye on the SC and procurement industry for signs of new developments. The ability to deal with problems in the future is enhanced for organizations that take steps to mitigate risks. The consequences of the pandemic on SCs may be mitigated for businesses with several suppliers.

This thesis investigates how Covid-19 affects the economies and supply chains of emerging nations. The impact of Covid-19 on economic growth throughout the world

was also analyzed. As a result of Covid19, factories and their supply networks all around the globe have been negatively impacted. The peak of the COVID-19 pandemic has already disrupted the supply chain, leading to the relocation or temporary shutdown of thousands of companies in underdeveloped countries. Supply chain disruptions induced by the epidemic prove that pandemics have had and will have far-reaching effects on the international supply chain in the future.

This thesis seeks to scientifically investigate the reasons of supply shortfall and the consequences this has in developing nations. in according to the result , the first article by Abosedra and Baghestani (1989) found that capital and international trade are important determinants of consumption in the US. The second article by Bohn (1994) found that debt has a positive effect on consumption in the US. The third article by Lee (1995) found that labor force growth has a negative effect on consumption in Korea.

The article by Daim and Ozbilgin (2019) found that the optimal capital structure varies depending on the economic environment of the country and a higher level of debt can lead to higher firm performance in certain contexts. The article by Greenaway and Hine found a positive relationship between trade and economic growth.

Overall, these articles support the importance of capital, trade, and debt in shaping consumption patterns, as well as the negative effect of labor force growth on consumption. However, further research is needed to establish causality between these factors and consumption.

## 6.2 Implication

Based on the regression model and the findings of various studies, policymakers can implement several measures to promote economic growth and consumption. Firstly, investment in capital should be prioritized as it has a positive impact on both economic growth and consumption. This can be encouraged through policies such as tax incentives for businesses to invest in new machinery and equipment.

Secondly, policymakers should promote international trade as it has a positive impact on economic growth and consumption. This can be achieved by focusing on free trade agreements and reducing barriers to trade. However, policymakers should also be mindful of managing debt levels as high levels of debt can lead to financial instability and economic downturns. Policies such as sound fiscal policies and regulating financial institutions can help in managing debt levels. Finally, addressing labor force growth by investing in education and training programs can mitigate the negative impact of labor force growth on consumption. Policies that promote income equality may also help to mitigate this impact.

Considering the variable TRADE2 (the supply chain) found in this research, emerging economies need to prioritize domestic production to take advantage of economic growth opportunities and to safeguard against supply chain disruptions brought on by natural disasters or other unforeseen circumstances. They will most certainly make poor nations even more reliant on aid from the developed world. Given the potential for development, it is suggested that developing countries (DC) raise its TRADE2 to prevent a supply deficit. In addition, DC with expansion prospects should boost spending on logistics and transportation to eliminate the supply bottleneck.

For this reason, the inverse relationship between CAPITAL and supply chain shortfall suggests that the decline in GDP is attributable to the expansion of DC. Since they have spent their whole savings on imports. If anything, these DC have less leverage in price negotiations with their suppliers. Since DC are in a better position to contribute raw materials and fund their national manufacturing to meet the supply interruption, KAPITAL should, in principle at least, have a favorable impact on the supply chain. Moreover, they may quickly and easily get capital in exchange for their raw materials. Simply said, if they can get financing, they can utilize that money to expand their operations, resulting in more profits. In addition, they may improve their economies by reducing supply network interruptions via rapid production increases. The opposing conclusion is supported by the findings of this investigation.

Also, this analysis shows that a higher rate of increase in TTRADE results in a shorter GDP period, suggesting that TTRADE and supply chains are inextricably linked. Thus, TTRADE has a beneficial effect on supply chain shortfall; raising TTRADE would raise DC GDP. Furthermore, smaller DC are more reliant on TTRADE, which results in a response that is more sensitive to fluctuation in GDP.

In summary, a multi-faceted approach is necessary for promoting economic growth and consumption. Policymakers should prioritize investment in capital, promote international trade, manage debt levels, and address labor force growth to achieve these goals.

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