

## A PANEL DATA ANALYSIS OF FIRMS' BEHAVIORS DURING THE COVID-19 GLOBAL PANDEMIC

Boniphace Albert Chacha

Email: [cboniphace3@gmail.com](mailto:cboniphace3@gmail.com)

Phone: +255 767 11 61 29

Curtin University – Australia

### Abstract

The proliferated growing number of literature evidences revealed that the Covid-19 global pandemic has negative impacts on global firms' behaviors in a particular revenue and price. The primary goal of this study is to analyze the firms' revenue and price from the month of January to October, 2020 (Covid-19 Pandemic Period). The panel data methodology was employed to address the objective of the study, accompanied by theoretical and empirical study evidences. The study findings revealed the significant positive relationships between the firms' revenue and the price (firms' behaviors) during the period from January to October the year of 2020.

**Key Words:** A Panel Data Approach; Firms' Behaviors; Covid-19 Global Pandemic; Revenue & Price

### Introduction and Theoretical Background

Recently literatures evidences shows that the Covid-19 global pandemic has negative and devastated impacts on the drivers of the market structure such as transportation and demand and supply chain which the final outcome of those negative impacts observed in the significant abnormal changes of firms prices and revenue. Considering the fact that the market structure is the core engine of the business firms to operate, the negative impacts of the Covid-19 global pandemic is ultimately well observed in the dramatic changes of firms' prices and revenue. From this point of view, this study is focusing on analyzing the firms' behaviors in a particular revenue and price through the panel data approach from the period of January 2020 to October 2020. The analysis of the firms' behaviors during the Covid-19 global pandemic is well accompanied by the theoretical and empirical study context. In a theoretical context of the study, three theories of epidemic theory, theory of the firm, and industrial organization theory are rigorously employed to address the theoretical part of the study. While in the empirical context of the study, 33 number of retrospective literature reviews were rigorously reviewed to identify the negative impacts of the Covid-19 global pandemic on firms' behaviors, revenue, and price.

Exemplifying the notion of the Covid-19 global pandemic on the entire firm operations and behaviors, the following literatures play that commitment. In a pragmatic example, (Balleer et al. 2020a), researched on demand and supply in reflection to the price – cutting firms behaviors as a result of the Covid-19 pandemic, the study results mention price cutting behaviors of the firm as the factor pushed by the dramatic increase of revenue from the buyers due to the uncertainty environments of the Covi-19 pandemic. Due to the buyer panic from the risk of the Corona virus, buyers rapidly making changing and focusing on buying in large quintiles which ultimately triggered the increase of revenue of the firms and changing of the behaviors of the firm to

address the buyers panic, (Pärson and Vancic 2020). The study of (Pärson and Vancic 2020) reveals that during the Covid-19 pandemic strategic behaviors of the firms were changed to reflect the buyer' big demand, these firms behaviors were observed through the increase of the price of the goods to meet the buyers panic demand.

## **Theoretical Background**

From the preamble background that the Covid-19 global pandemic has triggered the negative impacts on the entire firm operations and the outcome results being proved by the dramatic change of prices, demand, and revenue, the knowledge and linkage of the Covid-19 global pandemic and the firm behaviors become inevitable. The theoretical part of the study is profoundly addressing the linkage of the Covid-19 global pandemic and the firms' behaviors. The identified three theories of epidemic theory, theory of the firm, and industrial organization theory played that commitment of revealing the relationship of the Covid-19 global pandemic and the firms' behaviors.

The three theories (epidemic theory, theory of the firm, and industrial organization theory) are both have and connected by the theoretical constructs of the environment. Epidemic theory is focusing on analyzing the interactions of three theoretical constructs (variables), which are; the agent, the host, and the environment, (Heesterbeek and Dietz 1996). The theory is highlighting the circumstance where by the infectious pathogens is given to the compound of rats, and further the impacts in terms of the disease outcome and the deaths of the rates is studied, (Heesterbeek and Dietz 1996). Theory of the firm is the combination of many theories in the economic domain focusing on explaining the two theoretical constructs, first; the nature of the firm such as the structure, behaviors and its existence, second, the market structure of the firm, (Kraaijenbrink and Spender 2011). Industrial organization theory is primarily describing the interactions of the three theoretical constructs, which are; the strategic behaviors of the firm, the market structure of the firm, and the interactions of the strategic behaviors and the market structure, (Raible 2013).

## **Motivation of the Study**

The dramatic change and increase of prices from the business firms to consumers of goods due to the shortage of supply caused by the limitations of measures to respond and suppress the Covid-19 pandemic pose the indispensable motivation to undertake this study. The key drivers of the market structure such as the transportation and the demand and supply chain has significantly disrupted by the measures to respond the covid-19 global pandemic such as restriction in movements of people. From that regards, the affected market structure influenced the changes on the business firms' behaviors, operations, and performance at large. These changes occurred to the business firms are well revealed through the dramatic change of prices, and eventually revenue of the firms.

Exemplifying the notion of the Covid-19 global pandemic on the entire firm operations and behaviors, the following literatures play that commitment. In a pragmatic example, (Balleer et al. 2020a), researched on demand and supply in reflection to the price – cutting firms behaviors as a result of the Covid-19 pandemic, the study results mention price cutting behaviors of the firm as the factor pushed by the dramatic increase of revenue from the buyers due to the uncertainty environments of the Covi-19 pandemic. Due to the buyer panic from the risk of the Corona virus, buyers rapidly making changing and focusing on buying in large quintiles which ultimately triggered the increase of revenue of the firms and changing of the behaviors of the firm to address the buyers panic, (Pärson and Vancic 2020). The study of (Pärson and Vancic 2020) reveals that during the Covid-19 pandemic strategic behaviors of the firms were changed to reflect the buyer’ big demand, these firms behaviors were observed through the increase of the price of the goods to meet the buyers panic demand.

## **Research Questions and Methodology**

### **Research Questions**

**This study is undertaken to answer the following research questions;**

Is there any theoretical knowledge for the linkage of the Covid-19 global pandemic and the business firms’ behaviors?

What are the identified impacts of the Covid-19 global pandemic to the firms’ behaviors, revenues, and the price?

What a panel data proving on firms behaviors in the context of revenue and prices?

### **Methodology**

In the process of assessing the business firms’ behaviors in particular revenue and prices during the Covid-19 global pandemic the study has employed a panel data methodology to address the matter. The panel data methodology has been accompanied by theoretical and empirical context of the study to address the comprehensive goal of the study.

The panel data methodology has been applicable in addressing the quantitative context part of the study. Towards finding the appropriate results of the study through the panel data approach, 48 Coffee firms were selected from East Africa Regions accompanied by the data of revenue and prices collected during the period from January to October 2020 (Covid-19 global pandemic period).

Theoretical context of the study were covered by the three theories (Epidemic theory, theory of the firm, and industrial organization theory) focusing on describing the linkage of the Covid-19

global pandemic and the business firms' behaviors, performance, and entire operations. All three theories have been unified by the environment theoretical context to pose the linkage of the Covid-19 global pandemic and the business firms' behaviors, revenue, and prices.

Ultimately, the empirical part of the study were addressed through the 33 critical literatures review in the areas of Covid-19 pandemic and firms business behaviors', purposely to identify the significant negative impacts of the Covid-19 global pandemic on the business firms' behaviors', revenue, and the price.

### **Significance of the study**

The practical implications of the study will be on upholding and facilitating the decision making process focusing of enhancing global firms' growth particularly entrenched firms' resilience, prosperity, and investment management during the emergence period such as Covid-19 global pandemic.

Considering the increase of uncertainties environments and the occurrence of the global emergencies such as Covid-19 global pandemic, the contemporary study will be vital for decision making in the context of entrenched business firms thrive out from the emergence impacts, resilience of the firms, and investment management upholding.

Focusing on decision making through the application of theoretical context part of the study, the study will deliver the theoretical knowledge on the linkage of the Covid-19 global pandemic and the business firms, which will guide the clear understanding on the nature of problem (Covid-19 global pandemic) and how connected with the key drivers of business firms

While, in empirical context of the study, the empirical evidences on the identified negative impacts of the Covid-19 global pandemic to the business firms behaviors, revenue, and price, will elicit the potential areas to focus towards establishing resilience of the firms and entrench the thrive of the firms for sustainable investment undertaking.

The quantitative context of the study which have been addressed through the panel data methodology, will be vital in the decision making of the recent uncertainty environment of the Covid-19 global pandemic and the coming future emergencies in the aspects of proper control of the market structure, firms performance, firms operations, and firms behaviors for the enhancement of the firms prosperity.

### **Findings of the study and practical implications**

Findings of the study is categorized in three contexts, which are, theoretical context of the study findings, empirical context of the study findings, and the quantitative context of the study. While the practical implications of the study will focus on empowering the decision makes process in

the context of enhancing firms' prosperity, resilience for the firms, and investments management upholding.

A theoretical context finding reveals the nature linkage of the Covid-19 global pandemic and the entire business firms operations. The identified and applicable three theories (Epidemic theory, Theory of the firm, and Industrial Organization Theory) all have and well connected with the theoretical construct and notion named environment. Environment theoretical construct pose the linkage of the Covid-19 global pandemic and the business firms behaviors.

While, the empirical context finding reveals the potential negative impacts of the Covid-19 global pandemic to the business firms' behaviors, revenue, and prices.

Ultimately, the quantitative part of the study through the panel data methodology, findings reveals that there is a significant positive relationships of the firms behaviors in a particular revenue and prices during the period from January 2020 to October 2020 (The Covid-19 global pandemic period) , for the selected 48 Coffee firms from the East Africa Regions. In addition to that, the elasticity of demand varies positively reflecting the changes of prices, demand, and ultimately the revenue.

The practical implications of the study will be on upholding and facilitating the decision making process focusing of enhancing global firms' growth particularly entrenched firms' resilience, prosperity, and investment management during the emergence period such as Covid-19 global pandemic.

### **Objectives of the study**

The fundamental goal of the study is to analyze the firms' behaviors in a particular the trend of prices and revenues during the period from January to October 2020, while focusing on the three theoretical context, empirical context, and quantitative context of the study.

### **Chapter summary**

From the discussion of this introduction part of the study, the following parts of the study have made a significant contribution towards accomplishing this study; (1) Theoretical Background for the Linkage of the Covid-19 Pandemic and Firms' Performance, (2) Covid-19 Global Pandemic and Firms' behaviors, (3) Data, Materials, and Methodology (4) Results (5) Conclusion, (6) Acknowledgement, (7) Statement of Research Interest, (8) Reference

### **Theoretical Background for the Linkage of the Covid-19 Pandemic and Firms' Performance**

The proliferated number of literatures showing that the Covid-19 global pandemic has destructed the key drivers of the market structure for the business firms to operate and perform smoothly. The identified key drivers of the market structures (environment) are such as global transportation system and the demand and supply chain. These drivers of the market structure are

among the components of the environments, while the market structure is the core component and drive of the business firms operations, behaviors, and performance. Considering the impacts of the Covid-19 pandemic on the environments such as transport and demand and supply chain, the repercussion of those impacts influence the market structure in terms of affecting flow of goods, affecting price, and ultimately revenue of the firm. From that context of linkage of the Covid-19 global pandemic and the business firm through the cross cutting notion of environment, the theoretical context of the study address the analysis of the linkage of the Covid-19 pandemic, environment, and firm behaviors, operations, and performance.

The theoretical part of this study will be focusing on describing the linkage of the Covid-19 global pandemic and the firms operations and behaviors. The linkage of the Covid-19 global pandemic and the firms behaviors will be addressed through the cross cutting theoretical construct of environment which happen to the Covid-19 pandemic theories (The epidemic theory) as well happen to the firms behaviors theories (Theory of the firm and industrial organization theory). The identified three theories to address the linkage of the Covid-19 pandemic and firms behaviors and operations are; the epidemic theory, Theory of the firm, and industrial organization theory.

The following is the profound theoretical arguments from the three theories (The Epidemic theory, Theory of the firm, and Industrial organization theory) on the linkage of the Covid-19 global pandemic and the firm behaviors and operations through the cross cutting theoretical notion of environment;

### **Epidemic Theory**

Epidemic theory is focusing on analyzing the interactions of three theoretical constructs (variables), which are; the agent, the host, and the environment, (Heesterbeek and Dietz 1996). The theory is highlighting the circumstance where by the infectious pathogens is given to the compound of rats, and further the impacts in terms of the disease outcome and the deaths of the rates is studied, (Heesterbeek and Dietz 1996). From this regard, the identified theoretical constructs (Agent, host, and environment) will be employed to pose the understanding on how the environmental theoretical constructs can impact and engage the business firms behaviors and performances (Refer Table -1 for the comprehensive understanding on the theoretical constructs of the Epidemic theory).

Focusing on the linkage of the Covid-19 pandemic and the firm behaviors and operations, the epidemic theory showed the scenarios of the infectious disease to affect the host and the environment as well. From that perspective, the Covid -19 global pandemic demonstrated the impact on the key drives of the market structures such as transportation and demand and supply chain (People restricted to move from one place to another) , where the market structure is the key determinant of the of the business firms operations and behaviors, from the market structure being affected the ultimately results happen to the changes of business firms behaviors and actions which are well reveled through the changes of revenue and prices of the firms.

**Key Theoretical constructs building the theory of Epidemic towards showing the environmental interaction impacting on Firms behaviors and performance**

<b>Constructs</b>	<b>Explanations</b>
Agent	Agent is the infectious pathogen which can be given out to the host, in a pragmatic example, theoretical constructs mention the rats as the host
Host	The host is the animal (object) to whom the infectious pathogen is delivered to (Example the rats)
Environment	Environment is the place where by the agents (infectious pathogens) and the host can live, and further manage to transmit the pathogens from one point to another point

**Source: (Heesterbeek and Dietz 1996)**

Focusing on the study notion which addressing the analysis of the firms behaviors during the Covid – 19 pandemic, the theory of epidemic pose the understanding of the linkage of the Covid-19 pandemic and the firms behaviors and performance. The linkage of the Covid-19 pandemic and the firms behaviors and performance is made through the theoretical construct of environment. The environmental theoretical construct is the cross cutting notion and theoretical constructs which directly happen and explaining the epidemic theory and firm theories such as theory of the firm and industrial organization theory. From the epidemic theory, the environment is the one infectious pathogens and the host live, while the same environment is determining the business firms’ performance and behaviors. Meaning that, in the scenario the environment is affected by the infectious pathogens and the host, the repercussion is the affected environment must influence the business firms’ behaviors and performance.

The following is the discussion of other studies undertaken to analyses the linkage of the Covid-19 pandemic to the environment (The drivers of the market structure of the firms), in the context of infectious diseases impacts and destructions of the business environments (The drivers of the market structure of the firm) of the firms to operate smoothly.

Exemplifying the other studies findings on the linkage of the Covid-19 global pandemic and the environment (The drivers of the market structure), the study of (Lacono and Nichols 2017) focused on establishing the relationship and modeling of the environment and contagious diseases, revealed and emphasized that the environment such as climate change and the transport and communication are the main drivers of the infectious diseases. Consider our study notion of the linkage of the Covid-19 global pandemic and the market structure (The Environment – key drivers of the market structure such as transportation , and demand and supply), the meaning is from the logic that the Covid-19 pandemic is driven by the environment and affecting the drivers of the market structure, the ultimate results of the disruptions of the market structure is well

influence and impact the firms behaviors and performance because the market structure is the core element of the firms operations.

### Theory of the Firm

Theory of the firm is the combination of many theories in the economic domain focusing on explaining the two theoretical constructs, first; the nature of the firm such as the structure, behaviors and its existence, second, the market structure of the firm, (Kraaijenbrink and Spender 2011). Focusing to our study, theory of firm will focus on explaining the behaviors of the firm as the first theoretical construct for nature of the firm and further explaining the market structure of the firm which is basically including the environment the firm is operating. (Refer table no.2 for the comprehensive understanding of the theoretical constructs of the firm).

Focusing on the notion of the study, the theory of the firm is describing the scenarios where firms' behaviors such as revenue and price might be influenced and affected by the market structure such as the environment the firm is operating. The theory is exploring that for the firm to operate and the performance and behaviors to be observed, there must be the interaction of nature of the firm (for our case behaviors such as revenue and price) and the market structure (for our case the environment the firm is operating). The firm theoretical construct of market structure in our case the environment is cross cutting notion linking the Covid-19 pandemic and the firms behaviors and performance. The environment which firm is operating and further influence the firm value and price is the one affected by the prevalent of the Covid-19 pandemic (infectious pathogens).

**Table -2: The following table revealing the theoretical constructs of the firm which reveals the firms behaviors (For our case revenue and price) with the interaction to the market structure (environment)**

Construct	Explanations
Nature of the Firm	Is the potential features describing the particular firm existence, examples; behaviors of the firm, the structure of the firm, and the operations of the firm
Market structure	These are the main actors influence the behaviors and performance of the firm, example the environment the firm is operating, buyers, other competing sellers, and the chain of demand and supply

**Source: (Kraaijenbrink and Spender 2011)**

## Industrial Organization Theory

Industrial organization theory is primarily describing the interactions of the three theoretical constructs, which are; the strategic behaviors of the firm, the market structure of the firm, and the interactions of the strategic behaviors and the market structure, (Raible 2013).

Industrial organization theory is much addressing the notion of the study through focusing on explaining the strategic behaviors of the firms, for our case is revenue behaviors and price behaviors, and the market structure of the firm, for our case the environment, and ultimately observing their interaction during the period of the Covid-19 Pandemic. From that regards, the strategic behaviors of the firm (revenue and price) are determined by the environment of the market, in the occasion the environment of the market is affected or determined by the prevalent of the Covid-19 pandemic. Meaning that the Covid-19 pandemic is likely to affect the market structure (environment) example the disruption of demand and supply chain, and resources allocation and availability for the firm, which ultimately influence and impact the strategic behaviors of the firm (Example, revenue and price). (Refer table no. 3 for the comprehensive understand on the theoretical constructs of industrial organization theory)

The Covid-19 pandemic prevalent significantly destructed the environment which the firm is operating. The environment which firm is operating such as the demand and supply chain is exacting destructed by the Covid-19 pandemic, ultimately the affected environment impacted the strategic behaviors of the firm which revealed through the revenue and prices of the firm.

**Table-3: Describing the key theoretical constructs of industrial organization which pose the linkage to Covid-19 global pandemic in the aspect of environment.**

Theoretical Construct	Explanations
Strategic behaviors of the Firm	Are the actions of the firm which might influence the firm performance or other actors response against the firm, examples the actions or decision which might influence the revenue or price of the firm
Market Structure	These are the actors of the market of the firm such as environment, demand and supply chain, buyers, and other sellers
Their Interactions	Is the interactions of the firms strategic behaviors and the market structure

### Source: (Raible 2013)

The following is the discussion of other studies undertaken to analyses the linkage of the Covid-19 pandemic to the environment (The drivers of the market structure of the firms), in the context of infectious diseases impacts and destructions of the business environments (The drivers of the market structure of the firm) of the firms to operate smoothly.

The literature review of (Muleme 2012) focused on investigating the drivers of infectious disease, revealed environment and climate change is the significant factor of causing and speed up the diffusion of the infectious disease across the World. Engaging the notion of study focusing on the linkage of environment, the Covid-19 global pandemic, and the market structure, we argue that the Covid-19 global pandemic responding measures such as travelling restrictions destructs the determinants of the market structure such as the transportation of goods, and the demand and supply chain, the determinants of the market structure from being destructed pose the influence and impact to the firm behaviors and performance, which ultimately exhibited in the changes and contractions of revenue and prices of the business firms all across the World.

In conclusion of this theoretical part of the study, the linkage of the Covid-19 global pandemic and the firm behaviors, operations, and performance is well demonstrated through the cross cutting theoretical construct of environments. Meaning that the environment which firms depend to operate (such as transport and demand and supply chain) is the one highly affected by the Covid-19 global pandemic. The cross cutting theoretical construct of environment is well happen and explain by the identified theories of the epidemic theory, theory of the firm, and industrial organization theory.

### **The Covid-19 Pandemic & Firms Behaviors**

The proliferated growing number of literatures evidence reveals that the Covid – 19 global pandemic has deleterious impacts on the firms' behaviors, revenue, and prices. This happen from the argument that, the Covid-19 pandemic restrictions of people's movements triggered the destructions of the transport system of the goods, as well affecting the entire demand and supply chain. The transport system and the demand and supply are the key drivers of the market structure which is the core drive (market structure) of the business firm entire operations. The market structure from being disrupted by the Covid-19 global pandemic directly influenced the firms' behaviors, and ultimately the changes of the firms behaviors are well observed through the changes of prices and revenue of the firm. Exemplifying the notion of the Covid-19 global pandemic on the entire firm operations and behaviors, the following literatures play that commitment. In a pragmatic example, (Balleer et al. 2020a), researched on demand and supply in reflection to the price – cutting firms behaviors as a result of the Covid-19 pandemic, the study results mention price cutting behaviors of the firm as the factor pushed by the dramatic increase of revenue from the buyers due to the uncertainty environments of the Covi-19 pandemic. Due to the buyer panic from the risk of the Corona virus, buyers rapidly making changing and focusing on buying in large quintiles which ultimately triggered the increase of revenue of the firms and changing of the behaviors of the firm to address the buyers panic, (Pärson and Vancic 2020). The study of (Pärson and Vancic 2020) reveals that during the Covid-19 pandemic strategic behaviors of the firms were changed to reflect the buyer' big demand, these firms behaviors were observed through the increase of the price of the goods to meet the buyers panic demand.

The following is the comprehensive and profound explanations of the influence of the Covid – 19 pandemic on the firms’ behaviors, revenue, and the price.

### **The influence of the Covid-19 on Firms’ Behaviors**

The Covid-19 pandemic has demonstrated the deleterious impacts on the behaviors of the firms across the World. The behaviors of the firms which are observed through the actions and decisions of the firms against the market structure such as the price decision, demand and supply decisions, resources allocations decisions, are all entirely affected by the Covid 19 global pandemic. From the context of behaviors of the firms being affected it has triggered the dramatic changes of the firms’ prices and revenue as well across the world. In a pragmatic example, (Balleer et al. 2020a), researched on demand and supply in reflection to the price – cutting firms behaviors as a result of the Covid-19 pandemic, the study results mention price cutting behaviors of the firm as the factor pushed by the dramatic increase of revenue from the buyers due to the uncertainty environments of the Covi-19 pandemic. The following is the comprehensive literatures evidence addressing the notion of the Covid-19 global pandemic influence on the firms’ behaviors.

The Covid-19 pandemic prevalent poses the dramatic changes on buyers’ behaviors, strategic firms’ actions, and ultimately the changes of revenue and price of the firms. Exemplifying the trend of influence of the Covid-19 of the firm behaviors and performance, the research study of (Pärson and Vancic 2020) reveals that during the Covid-19 pandemic there were buyers panic and change in behaviors of buying, buyers panic triggered the increase buying of goods with repercussion to revealed to the change of firms behaviors through the increase of revenue and prices of the most demanded goods. One of the significant impact of the Covid-19 pandemic is the destruction of the demand and supply chain, which cause the significant changes of firms strategic behaviors due to the shortage of goods at a time of high demand of the un available goods, (OECD 2020). Firms behaviors changed to accommodate the high demand of goods at a time the supply chain is serious destructed by the Covid – 19 pandemic, ultimately caused the dramatic increase of price and revenue for the firms, (Oecd 2020). In a pragmatic example, (Balleer et al. 2020a), researched on demand and supply in reflection to the price – cutting firms behaviors as a result of the Covid-19 pandemic, the study results mention price cutting behaviors of the firm as the factor pushed by the dramatic increase of revenue from the buyers due to the uncertainty environments of the Covi-19 pandemic. From the impacts of the Covid-19 pandemic to business firms, strategic firms behaviors in the aspects of digitalization, cultural change, and firms environments were significantly changed to address the Covid – 19 pandemic situations, (Kraus et al. 2020). The research study of (Mehta, Saxena, and Purohit 2020) mentioned the new paradigm of consumers behaviors change is the main factors caused the firms strategic behaviors change during the Covid – 19 global pandemic. Consumer buying behaviors increased during the Covi-19 pandemic, which led to the change of firms behaviors as reflected by the increase of prices of goods and revenue as well, (Mehta, Saxena, and Purohit 2020). The research study of (Donthu and Gustafsson 2020) investigating the impact of the Covid-19 pandemic on the business revealed that the Covid-19 pandemic has triggered the dramatic changes of the firms behaviors and the consumers demand across the world. The report of the African development

bank revealed that the Covid-19 pandemic has caused the dramatic economic impacts in the Asia region which are observed through the changes of the firms investments behaviors, economic sectors performance such as tourism has decline, and business activities as well, (AfricanDevelopmentBank 2020). The dramatic increase of the house hold consumption is identified to be one of the factor triggered the change of the firms strategic behaviors in reflection of increase of prices of the house hold goods across the World, (Martin et al. 2020).

### **Firms' Revenue & Covid-19 Global Pandemic**

From the point of view of firms performance being disrupted from the Covid – 19 global pandemic, the long term outcome results is well observed to the contraction of the tremendous firm across the World. The long time impacts of the Covid-19 pandemic reveals the dramatic decline of the firms revenue which resulted to the unemployment and poverty increase, (InternationalLaborOrganization and Oecd 2020). The following is the comprehensive literatures evidence addressing the notion of the Covid-19 global pandemic influence on the firms' revenue.

The World bank reports on assessing the impact of the pandemic on the industrial sector, showed that due to the Covid 19 pandemic the demand and supply chain were severely destructed which ultimately triggered the dramatic decline of the firms revenue, (Unido 2020). Due to the buyer panic from the risk of the Corona virus, buyers rapidly making changing and focusing on buying in large quintiles which ultimately triggered the increase of revenue of the firms and changing of the behaviors of the firm to address the buyers panic, (Pärson and Vancic 2020). From the destructed supply chain due to the prevalent of the Corona virus, it caused the increase of price and revenue of the large number of firms across the world, (OECD 2020). The dramatic contraction of the global trade and developments due to the Covid-19 pandemic impacts is well reflected through the destructed on demand and supply chain eventually led to shortage of goods, increase of prices and revenue for the firms across the world, (UnitedNations 2020). The study of (Shen et al. 2020) reveals that among the impacts of the Covid-19 global pandemic id on the global firms performance has been demonstrated on the dramatic increase of the firms revenue.

The world bank report which investigated the impact of the Covid-19 global pandemic on developing countries business firms shows that the virus has negative impact on the firms revenue, (Christine et al. 2020). The long time impacts of the Covid-19 pandemic reveals the dramatic decline of the firms revenue which resulted to the unemployment and poverty increase, (InternationalLaborOrganization and Oecd 2020). Exemplifying the notion of revenue contractions for the global firms, the research of (Acca 2020) revealed that global firms will lost the revenue of about 80% in the year of 2020. Another pragmatic example is the dramatic collapse and closure of the small and medium enterprises around the world due to the pandemic impacts to the firms' revenue, (Kalemli-Ozcan et al. 2020). In the united kingdom (UK) it is estimated that 80% of the small and medium firm' revenue have been lost due to the impact of the Covid-19 pandemic, (Albonico, Mldenov, and Sharma 2020). Moreover, studies showing that the revenue of the airport places are dramatically declined due to the covid-19 global pandemic, (Twinn et al. 2020).

## Firms' Price & Covid-19 Global Pandemic

The recent literature review shows that the Covid-19 global pandemic has negatively the key drivers of the business firms to operate such as transportation of goods, and the demand and supply chain. The repercussion of these impacts of the Covid-19 global pandemic is well observed through the significant price fluctuation and increase of prices of the tremendous business firms across the World. The Covid-19 global pandemic has caused a significant price fluctuation of the consumer goods due to the uncertainty of the demand and supply across the world, (Brodeur et al. 2020). The following is the comprehensive literatures evidence addressing the notion of the Covid-19 global pandemic influence on the firms' price across the World.

The study of (Pärson and Vancic 2020) reveals that during the Covid-19 pandemic strategic behaviors of the firms were changed to reflect the buyer' big demand, these firms behaviors were observed through the increase of the price of the goods to meet the buyers panic demand.

Firms in Germany were supposed to employ the price cut- behaviors due to the increase of demand of goods in the time of disrupted supply chain due to the Covid-19 pandemic impacts, (Balleer et al. 2020a). The Covid-19 global pandemic has caused a significant price fluctuation of the consumer goods due to the uncertainty of the demand and supply across the world, (Brodeur et al. 2020). The un stable demand and supply chain due to the Covid 19 pandemic has triggered the significant price fluctuations for the home commodities at Indonesia country, (Nendissa, Olviana, and Kapioru 2020). The report of the United nations revealed that corona virus has led to the shortage or failure of trading globally and the ultimately results revealed on the constant fluctuation of the prices in particular for the international goods such as petrol, (ECLAC 2020). Exemplifying the fluctuation and decline of the prices due to the Covid-19 global pandemic, the global stock markets is a pragmatic example, (Machmuddah et al. 2020), revealed that the global stock markets prices is significantly declined and fluctuated which pose the risk on investors to trade on stock markets. Another pragmatic example of the Covid-19 global pandemic shocks is the increase of international trade costs which repercussion revealed on the increased price of the most of imported goods , (Maliszewska, Mattoo, and Van Der Mensbrugge 2020). Export restrictions has been identified as one factor triggered the increase of the prices for the food markets across the world, (Espitia, Rocha, and Ruta 2020). In Pakistan, stock exchange markets were all the time fluctuated while going down as the results the investors withdrawn the stocks due to the perceived trading risks in the stock markets, (Ahmed 2020). The demand and supply chain destructions has significantly led to the shortage of the goods and resources to the global firms, in responding to this situation global firms were pushed into increasing the prices, (Balleer et al. 2020b).

In conclusion, the literatures observations indicating that the Covid -19 global pandemic has demonstrated the deleterious impacts on the key drivers of the firms performance such as transportation and demand and supply chain from the point of implementations movement restrictions of the people towards suppressing the corona virus. The outcome of the impact of the Covid-19 global pandemic on the key drivers of the business firms is well observed through the changes of the firms' behaviors, prices, and ultimately revenue.

### **Data, Materials & Methodology**

Towards addressing the objective of the study which focused on a panel data analysis of firms' behaviors during the Covid-19 pandemic from the month of January to October in the year of 2020, the study employed panel data methodology to meet that commitment, in a particular dynamic panel data. The study design was qualitative and quantitative approach.

In a qualitative approach, the theoretical and empirical approach were employed to analyze the linkage of the Covid-19 global pandemic and the firms behaviors, the linkage of the Covid-19 global pandemic and the firms behaviors were mate through the theoretical approach. Further, the empirical approach was employed to identify the significant impacts and influence of the Covid-19 pandemic on firms' behaviors, revenue, and price. The 33 literature review were employed and reviewed to meet the study goals.

In a quantitative approach, the panel data approach in a particular dynamic panel data were employed to answer the goal of the study. The data were collected from the selected 48 business firms operated at East Africa region from the month of January to the month of October during the year of 2020 (Covid-19 global pandemic period). The Panel procedures from SAS/ETS 14.2 instrument were used in the estimation process. Towards focusing on the practical observation of the relationship of the firms behaviors in the context of coffee revenue against the price, the panel data approach in a particular dynamic panel data were used focusing on two divided approaches (Cross-sectional model, and Dynamic Model). The cross sectional model has been used to address to address two findings (Pooled regression, and including cross sectional effects). Where the cross section effects the observations were undertaken in two scenarios (Within transformation, and First-differencing transformation). From the context of the two approach of the dynamic model (Cross-section, and dynamic model). The dynamic model was ultimately employed to evaluate the relationship of revenue and price through the estimation of generalized method of moments (GMM2). The observation results revealed a significant positive relationship between the Coffee revenue and the price during the month of January to the month of October during the year of 2020. In addition to that the elasticity of demand varies positively reflecting the changes of prices then following to the change of revenue, meaning that the slight increase of price leads to the same percent change of increase of the revenue of the coffee.

### **Focus on Methodology Details**

The study will employ the Panel data methodology to address the firms' performance in the aspects of value and price. From that regards, the SAS/ETS Software model of the panel data will significantly be deployed by the study for addressing regression estimations and standard errors.

Panel data is applicable for the observation of the panel of peoples (individuals), institutions, or households and further delivering their observations during a specific period of observation. The panel data has two categories to undertake the dimension; first, individual persons dimension (Also known as Cross section dimension), second, time aspect dimension.

Addressing the diversity of observations (heterogeneity) the Dynamic panel models is the appropriate model to be employed in a panel data observation.

**A dynamic panel model is categorized in two forms as a part of linear regression;**

First, Cross-sectional model (Considering Individual persons Effects)

Second, Dynamic model

Considering the first Cross sectional effects to linear regression;  $i= 1, \dots, N$  for the specified time  $t = 1, \dots, T_i$ ,

$$Y_{it} = B_0 + B_x X_{it} + v_i + E_{it}$$

From the above equations;  $X_{it}$  represents Variables explanations,  $V_i$  represents individuals (peoples) effects, while  $E_{it}$  errors of regression from different levels of observations.

Focusing on analyzing the relationship of the value and price of the firm during the year of Covid-19 pandemic (2020), the study will employ the Dynamic panel model to address the matter. Dynamic panel model is a basically a sub topic (study branch) of econometrics primarily focusing on finding and establishing optimal estimation strategy considering the nature data of the particular observation of panel.

### **Revenue and Price Data for Selected Firms**

Consider revenue and price data of coffee for selected 48 firms in East Africa during the month of January 2020 to October 2020.

#### **Appendix 1: Data for 48 Selected Firms**

**(Refer the attached appendix data)**

Considering the given data above, the study variables are; Firm, Month, Revenue, and Price. The study focus is on assessing the relationship of revenue and price during the year of Covid-19 pandemic (From the month of January 2020 to October, 2020). From that context, you observe that revenue collected from firms might be different in the occasion price has not been a matter, and further reveal there a number of factors which are not yet measured and might affect the current and the coming firms revenue. From that regard, the study employ Dynamic panel data for accommodating firms' other factors effects accompanied by a lagged dependent variable.

Consider the following equation

$$\text{Revenue (fm)} = B_0 + \beta \text{Revenue (f), (m-1)} + B_1 \text{Price (fm)} + V_f + E (fm)$$

Where by;  $f$  is representing Firm, and  $m$  representing month

The following equation method will be guiding the measurement of finding the lagged variables affect and influenced the revenue.

**Panel data = Coffee**

**Id Firm Month**

**Clag Revenue (1)/ Out = Coffee Lagged;**

**Run;**

Towards evaluating the relationships of firms' revenue and prices during the year of Covid-19 global pandemic (2020), the study will focus on employing PANEL procedures from SAS/ETS 14.2 User's Guide.

**Step – 1 [Regression Pooling]**

Considering and pooling all the data together without considering their firms' affiliation, this is known as Pooled Regression. From that context, the focus is on fitting the dynamic panel model through the ordinary least square.

The following model equation (statement) which including the lagged Revenue variable and specified pooled option will be employed in the process of fitting the model through PANEL Procedure.

**Proc panel data = Coffee lagged**

**Id Firm Month;**

**Model Revenue = Revenue\_1 Price/ Pooled**

**Run;**

**Figure – 1**

**The following figure reveals the regression results from the coffee revenue data through pooled estimation.**

The Panel procedure through the pooled estimates (Ordinary Least Square)

The dependent Variable to be; Revenue (Logarithm of per Capital coffee Revenue)

### Model

The method employed in making estimation	Pooled
Cross Sections (Number of Firms)	48
Time duration (January 2020 – October 2020)	10 Months

### Fitting Statistics Results

SSE	175.3621	DFE	477
MSE	0.3676	Root MSE	0.6063
R- Square	0.2605		

### Parameter Estimation

Variable	DF	Estimation	Standard Error	t- Value	Pr> t	Label
Intercept	1	2.651903	0.2465	10.76	< .0001	Intercept
Revenue_1	1	0.405989	0.0423	9.60	< .0001	Lagged Per Capita Coffee Revenue
Price	1	0.466423	0.0977	4.77	< .0001	Log of Coffee Price

### Discussion

From the above estimations, the focus is on evaluating the relationship of Coffee revenue and the price for the selected 48 firms during the period of Covid – 19 global pandemic (January 2020 to October 2020) in the East Africa Region through pooled estimation.

From the fact that pooled estimation does not count and consider the firms affiliation meaning that the above estimation have not included the firms effects (vi). As pooled estimation ignoring the firms affiliation and firms effects (vi) from this point, the interpretation meaning is that; the

coefficient of revenue 0.405989 (from the table above) stand for the correlation between the revenue of the current month and the previous month after determining and controlling the price.

‘From that regards, the meaning is there is unmeasured factors that affects the revenue of coffee for the selected 48 firms, and these effects prevail for a long coming duration.

Exemplifying the relationship of Coffee revenue and the price from the obtained elasticity of demand 0.405989 (Estimated 0.466); From the context that the given data is including the logarithms of revenue and prices, the coefficient for the price 0.466 can be regarded as Demand elasticity. In a pragmatic example, the ten percentage escalation of the Coffee price the repercussion will be 4.66% escalation of revenue. However the estimations above have ignored the firms affiliation affects since we have employed pooled estimation method.

In conclusion, the findings of the estimation through pooled regression reveal that, coffee revenue and price had significant positive relationship during the moth from January 2020 to October 2020 (Covid-19 global pandemic period).

## Step – 2

### Focusing on Including cross sectional Effects

The first part analysis of the firm revenue and price did not include the cross sectional effects, in this part the focus will be on including the cross sectional effects.

Considering the fact that (Step-1) pooled regression has ignored cross sectional effects, to take these effects into consideration we must focus on using a method that take out (remove) the cross section effects from being estimated. The meaning of removing the cross section effects is that, those effects can no longer needed to be estimated directly, and his is the proper, reliable and convenient for the application of large number of data set.

Towards removing cross sectional effects we will focus on employing two approaches; First, The within transformation approach, second, the first difference transformation.

#### (a) The analysis of Within Transformation

The basic focus is understood this method (within transformation) tend to minus (subtracts) from each results or observation its cross-sectional mean. In the dynamic panel model this application will bring the following fundamental equation;

$$Y_{it} - Y_i = *(Y_{i, t-1} - Y_{i-1}) + B_x (X_{it} - X_i) + (E_{it} - E_i)$$

From this equation, we focus on using our given data of coffee revenue and prices in estimation the results through FIXONE option, the following statement is going to be applicable;

Proc of the panel data = Coffee Lagged;

Id Firm Month

Model Revenue = Revenue \_1 Price/ Noint Fixone

**Figure 2 Regression results from coffee revenue data through making the estimation by the within transformation**

The panel data procedure

D.V: Revenue (Logarithm of per capita Coffee Revenue)

**Model Explanations**

The Method Being used for making estimation	FixOne
Number of selected firms (Cross sections)	48
Number of the months during the 2020 (Time Duration)	10

**Fitting Statistics Results**

SSE	134.8807		DFE	430
MSE	0.3137		The Root Of MSE	0.5601
R-Square	0.4312			

**Considering the case of F – Test in the occasion of Fixed Effects while No Intercept**

Num DF	Den DF		F - Value	Pr>F
48	430		5.52	< .0001

**The parameter estimation results are as follows;**

Variable	DF	Estimation	Standard Error Estimation	t-Value	Pr>/t/	Label
Revenue_1	1	0.070878	0.0490	1.45	0.1489	Lagged per capital Cofee Revenue
Price	1	0.074586	0.0.0939	7.95	< .0001	Coffee Price

**(b) Focusing on the first-Differencing Transformation**

In this scenario, the methodology tends to subtract the past observation from the present observation. The following equation will be employed in the application process

$$Y_{it} - Y_{i, t-1} = \alpha(Y_{i, t-1} - Y_{i, t-2}) + \beta X_{it} - X_{i, t-1} + (E_{it} - E_{i, t-1})$$

On application process we will be forming difference equations, further the first-differencing might be obtained through specifying FDONE option in the following model

**Proc of the panel data = Coffee Lagged;**

**Id Firm Month**

**Model Revenue = Revenue\_1 Price/ Noint fDone**

**Figure -3: Demonstrating the different estimations from the above and first approach (The within Transformation)**

-Coffee Revenue data from the estimation done through First differencing

PANEL PROCEDURE

D.V: Revenue (Logarithms per capita Coffee Revenue)

**Parameter Estimation Results**

Variable	DF	The estimation	Standard Error	T - Value	P> /t/	Label
Revenue_1	0	-0.33234	0.0331	-10.03	< .0001	Lagged per capita Coffee Revenue
Price	0	0.368672	0.1453	2.54	0.0115	Log of the Coffee Price

**The Dynamic Panel Model Estimation**

Focusing on the dynamic panel model of estimation for evaluating the relationship of the coffee revenue and the price, in the dynamic panel model the origination of the endogeneity is well known and make the process of selecting and choosing the suitable variable become easier.

From the Panel Procedures application the following equation SAS will be applicable;

**Proc Panel Data = Coffee lagged ;**

**Id Firm Month**

**Instruments depvar;**

**Model Revenue = Revenue \_1 Price/ gmm2 noint nolevels robust artest = 2;**

**Running;**

Procedures for the Panel

Generalized Method of Moments: The First Difference Transformation

DV: Revenue (Logarithms of per capita Coffee Revenue)

**Model Explanations**

The Method used for estimation	GMM2
The applicable and identified cross sectional number	48
Time duration (Time length)- Number of months	10
The estimation level of stage	2
MAXBAND	1

**Fitting Statistics**

SSE	8056.3517	DFE	382
MSE	21.0899	ROOT MSE	4.5924

**Sargan Testing**

DF	Statistic	Prob>ChiSq
6	360.52	< .0001

**The Estimation of the Parameter**

Variable	DF	Estimation	The Standard Error	t-Value	Pr> /t/
Revenue_1	1	0.353772	0.00360	98.21	< .0001
Price	1	-0.35524	0.00939	-37.82	< .0001

### AR (m) Testing

Lag	Statistic	Pr> Statistic
1	-5.16	2.456E-7
2	1.02	0.3058

**The following is the discussion of other studies undertaken to analysis the firms (organization) behaviors and performance through the application of a panel data accompanied by their findings and opinions.**

The research study of (Garcia 2012) focused on investigating the revue and expenditure paradigm and trends at the Spanish areas (regions) by using the panel data approach, the findings of his research revealed that there were significant unidirectional relationships between the revenue collected and the expenditure within the Spanish regions. (Garcia 2012) study findings exhibiting different outcome compared to our study, since our study reveals the relationship of revenue and price is significant positive.

In a different observation perspective, the study of (Kotakou 2011), focused on researching the application of the given panel data to address the unbalanced panel data in the case study of cotton in Greece, focusing on the application of panel data their study employed pooled regression, then random effects, and finally fixed effects, the findings of his study revealed that, the elasticity of cotton supply during the period given with the reflection of the given price is primarily depending on the farm size, (Kotakou 2011). The study findings and application of the panel data by (Kotakou 2011) is basically resemble with our study approach and findings, our study focused on assessing the relationship of coffee revenue for the selected 48 firms in East Africa during the period of Covid-19 global pandemic from the month of January to October 2020, our study as well employed pooled regression, and fixed effects assessment as well, our study findings resemble to the findings of (Kotakou 2011), in the context that; we results revealed the elasticity demand is primarily determined by the changes of price which as well happened to the revenues collected of the coffee.

The addition research study conducted by , (Qian et al. 2015), focused on assessing the relationship of real estate value and the GDP in China during the period from 2002 to 2012. His study as well employed the panel data approach on evaluating the relationship of Real estate value and the GDP in China for the 29 China provinces, the findings of the research revealed that their positive relationship between the real estate value and the GDP in China for the identified 29 provinces during the period from 2002 to 2012, (Qian et al. 2015). The study findings of (Qian et al. 2015) is well resemble to our study findings, in the context that, our study findings reveals the positive relationship of the coffee revenue and the price during the period of Covid - 19 pandemic from the month of January to October, 2020, meaning that the elasticity demand varies positively reflecting the price change and further coffee revenue change positively.

### **Findings of the study and practical implications (Results)**

Findings of the study is categorized in three contexts, which are, theoretical context of the study findings, empirical context of the study findings, and the quantitative context of the study. While the practical implications of the study will focus on empowering the decision makes process in the context of enhancing firms' prosperity, resilience for the firms, and investments management upholding.

A theoretical context finding reveals the nature linkage of the Covid-19 global pandemic and the entire business firms operations. The identified and applicable three theories (Epidemic theory, Theory of the firm, and Industrial Organization Theory) all have and well connected with the theoretical construct and notion named environment. Environment theoretical construct pose the linkage of the Covid-19 global pandemic and the business firms behaviors.

While, the empirical context finding reveals the potential negative impacts of the Covid-19 global pandemic to the business firms' behaviors, revenue, and prices.

Ultimately, the quantitative part of the study through the panel data methodology, findings reveals that there is a significant positive relationships of the firms behaviors in a particular revenue and prices during the period from January 2020 to October 2020 (The Covid-19 global pandemic period) , for the selected 48 Coffee firms from the East Africa Regions. In addition to that, the elasticity of demand varies positively reflecting the changes of prices, demand, and ultimately the revenue.

The practical implications of the study will be on upholding and facilitating the decision making process focusing of enhancing global firms' growth particularly entrenched firms' resilience, prosperity, and investment management during the emergence period such as Covid-19 global pandemic.

### **Conclusion**

Recently literatures evidences shows that the Covid-19 global pandemic has negative and devastated impacts on the drivers of the market structure such as transportation and demand and supply chain which the final outcome of those negative impacts observed in the significant abnormal changes of firms prices and revenue. Considering the fact that the market structure is the core engine of the business firms to operate, the negative impacts of the Covid-19 global pandemic is ultimately well observed in the dramatic changes of firms' prices and revenue.

Findings of the study is categorized in three contexts, which are, theoretical context of the study findings, empirical context of the study findings, and the quantitative context of the study. While the practical implications of the study will focus on empowering the decision makes process in the context of enhancing firms' prosperity, resilience for the firms, and investments management upholding.

A theoretical context finding reveals the nature linkage of the Covid-19 global pandemic and the entire business firms operations. The identified and applicable three theories (Epidemic theory, Theory of the firm, and Industrial Organization Theory) all have and well connected with the theoretical construct and notion named environment. Environment theoretical construct pose the linkage of the Covid-19 global pandemic and the business firms behaviors.

While, the empirical context finding reveals the potential negative impacts of the Covid-19 global pandemic to the business firms' behaviors, revenue, and prices.

Ultimately, the quantitative part of the study through the panel data methodology, findings reveals that there is a significant positive relationships of the firms behaviors in a particular revenue and prices during the period from January 2020 to October 2020 (The Covid-19 global pandemic period) , for the selected 48 Coffee firms from the East Africa Regions. In addition to that, the elasticity of demand varies positively reflecting the changes of prices, demand, and ultimately the revenue.

The practical implications of the study will be on upholding and facilitating the decision making process focusing of enhancing global firms' growth particularly entrenched firms' resilience, prosperity, and investment management during the emergence period such as Covid-19 global pandemic.

## **Acknowledgement**

**Non**

## **Statement of Declaration of interest**

No research interest on this study

## **Reference**

Acca. 2020. "Covid-19 Global Survey: Inside Business Impacts And Response." Association of Chartered Certified Accountants, (ACCA).

AfricanDevelopmentBank. 2020. "The Economic Impact of the COVID-19 Outbreak on Developing Asia." African Development Bank (ADB), No. 128, 6 March, 2020 9 (128). doi:10.22617/BRF200096.

Ahmed, SheharYar. 2020. "Impact of COVID-19 on Performance of Pakistan Stock Exchange." SSRN Electronic Journal, no. July: 1–12. doi:10.20944/preprints202007.0083.v1.

Albonico, Maria, Zdravko Mldenov, and Ruchi Sharma. 2020. "How the COVID-19 Crisis Is Affecting Pakistan's Economy." McKinsey & Company, Public Sector Practice, no. June. <https://www.dw.com/en/how-the-covid-19-crisis-is-affecting-pakistans-economy/a-54292705>.

- Balleer, Almut, Sebastian Link, Manuel Menkhoff, and Peter Zorn. 2020a. "Demand or Supply? Price Adjustment during the COVID-19 Pandemic." CESifo Working Paper.
- . 2020b. "Demand or Supply? Price Adjustment during the COVID-19 Pandemic." CESifo Working Paper, No. 8394, Center for Economic Studies and Ifo Institute (CESifo), Munich, no. 8394.
- Brodeur, Abel, Davi Gray, Anik Islam, and Suraiya Jabeen Bhuiyan. 2020. "A Literature Review of the Economics of Covid-19." IZA Institute of Labor Economics, Initiated by Deutsche Post Foundation, Discussion Paper Series, IZA DP, No. 13411, no. 13411: 0–61.
- Christine, Marie, Apedo-Amah Besart, Avdiu Xavier Cirera, Marcio Cruz, Elwyn Davies, Arti Grover, Leonardo Iacovone, et al. 2020. "Unmasking the Impact of COVID-19 on Businesses Firm Level Evidence from Across the World." World Bank Group- Finance, Competitiveness and Innovation Global Practice, October 2020, no. October 2020. <http://www.worldbank.org/prwp>.
- Donthu, Naveen, and Anders Gustafsson. 2020. "Effects of COVID-19 on Business and Research." *Journal of Business Research* 117 (June): 284–89. doi:10.1016/j.jbusres.2020.06.008.
- ECLAC. 2020. "The Effects of the Coronavirus Disease (COVID-19) Pandemic on International Trade and Logistics." United Nations, ECLAC, no. 6: 1–22. <https://www.cepal.org/en/publications/45878-effects-coronavirus-disease-covid-19-pandemic-international-trade-and-logistics>.
- Espitia, Alvaro, Nadia Rocha, and Michele Ruta. 2020. "Covid-19 and Food Protectionism : The Impact of the Pandemic and Export Restrictions on World Food Markets." World Bank Policy Research Working Paper, no. 9253.
- Garcia, Manuel Jaen. 2012. "The Revenues-Expenditures Nexus : A Panel Data Analysis of Spain ' s Regions." *International Journal of Academic Research in Economics and Management Sciences* January 2012, Vol. 1, No. 1, no. January 2012.
- Heesterbeek, J. A.P., and K. Dietz. 1996. "The Concept of R0 in Epidemic Theory." *Statistica Neerlandica* 50 (1): 89–110. doi:10.1111/j.1467-9574.1996.tb01482.x.
- InternationalLaborOrganization, and Oecd. 2020. "The Impact of the COVID-19 Pandemic on Jobs and Incomes in G20 Economies." ILO-OECD Paper Prepared at the Request of G20 Leaders Saudi Arabia's G20 Presidency 2020.
- Kalemli-Ozcan, Sebnem, Pierre-Olivier Gourinchas, Veronika Penciakova, and Nick Sander. 2020. "COVID-19 and SME Failures." *IMF Working Papers* 20 (207). doi:10.5089/9781513557748.001.
- Kotakou, Christina. 2011. "Panel Data Estimation Methods on Supply and Demand Elasticities: The Case of Cotton in Greece." *Journal of Agricultural and Applied Economics* 43 (1):

111–29. doi:10.1017/s1074070800004089.

Kraaijenbrink, Jeroen, and JC Spender. 2011. “Theories of the Firm and Their Value Creation Assumptions.” *31st Strategic Management ...*, no. 1937: 1–7. <http://kraaijenbrink.com/wp-content/uploads/2012/06/Theories-of-the-firm-and-their-value-creation-assumptions-Kraaijenbrink-Spender-22-02-2011.pdf>.

Kraus, Sascha, Thomas Clauss, Matthias Breier, Johanna Gast, Alessandro Zardini, and Victor Tiberius. 2020. “The Economics of COVID-19: Initial Empirical Evidence on How Family Firms in Five European Countries Cope with the Corona Crisis.” *International Journal of Entrepreneurial Behaviour and Research* 26 (5): 1067–92. doi:10.1108/IJEER-04-2020-0214.

Lacono, Giovanni Lo, and Gordon L. Nichols. 2017. “Modeling the Impact of Environment on Infectious Diseases.” *Oxford Research Encyclopedia of Environmental Science*, no. September. doi:10.1093/acrefore/9780199389414.013.339.

Machmuddah, Zaky, St Dwiarso Utomo, Entot Suhartono, Shujahat Ali, and Wajahat Ali Ghulam. 2020. “Stock Market Reaction to COVID-19: Evidence in Customer Goods Sector with the Implication for Open Innovation.” *Journal of Open Innovation: Technology, Market, and Complexity* 6 (4): 1–13. doi:10.3390/joitmc6040099.

Maliszewska, Maryla, Aaditya Mattoo, and Dominique Van Der Mensbrugge. 2020. “The Potential Impact of COVID-19 on GDP and Trade: A Preliminary Assessment.” *World Bank Policy Research Working Paper*, no. 9211.

Martin, Amory, Maryia Markhvida, Stéphane Hallegatte, and Brian Walsh. 2020. “Socio-Economic Impacts of COVID-19 on Household Consumption and Poverty.” *Economics of Disasters and Climate Change* (2020) 4:45–49. <https://doi.org/10.1007/S41885-020-00070-3>. doi:10.1007/s41885-020-00070-3.

Mehta, Seema, Tanjul Saxena, and Neetu Purohit. 2020. “The New Consumer Behaviour Paradigm amid COVID-19: Permanent or Transient?” *Journal of Health Management* 22 (2): 291–301. doi:10.1177/0972063420940834.

Muleme, Michael. 2012. “Drivers of Infectious Disease Outbreaks: How Climate, Environment and Disease Control Programs Influence Occurrence of Infectious Disease Outbreaks.” In *Partial Fulfillment for the Degree of MASTER OF SCIENCE Major Department: Veterinary and Microbiological Sciences Program Name: International Infectious Disease Management and Biosecurity* 701 (December 2012): 8888.

Nendissa, D.R., T. Olviana, and C. Kapioru. 2020. “The Impact of the Covid-19 Pandemic on Price Disparities and Fluctuations of Shallots in Traditional Markets.” *Russian Journal of Agricultural and Socio-Economic Sciences* 103 (7): 113–19. doi:10.18551/rjoas.2020-07.14.

Oecd. 2020. “Tackling Coronavirus (Covid - 19): Contributing To A Global Effort - The Impact

- of the Coronavirus (Covid - 19) Crisis on Development Finance.” OECD, Oecd.Org/Coronavirus.
- OECD. 2020. “Tackling Coronavirus (Covid-19): Contributing To A Global Effort, Exploitative Pricing in the Time of COVID-19.” OECD, Oecd.Org/Coronavirus, no. May: 1–15. <https://www.oecd.org/daf/competition/Exploitative-pricing-in-the-time-of-COVID-19.pdf>.
- Pärson, Gustav, and Alexandra Vancic. 2020. “Changed Buying Behavior in the COVID-19 Pandemic: The Influence of Price Sensitivity and Perceived Quality.” Kristianstad University Sweden, Master Thesis, 15 Credits, for the Degree of Master of Science in Business Administration: International Business and Marketing Spring Semester 2020 Faculty of Business, 94. [www.hkr.se](http://www.hkr.se).
- Qian, Huachao, Jian Chen, Qi Wang, and Chen Liu. 2015. “A Panel Data Analysis on the Relationship Between Real Estate Value And GDP.” International Conference on Civil, Materials and Environmental Sciences (CMES 2015), no. Cmes: 134–37. doi:10.2991/cmcs-15.2015.39.
- Raible, Max. 2013. “Industrial Organization Theory and Its Contribution to Decision-Making in Purchasing.” 2nd IBA Bachelor Thesis Conference, University of Twente P.O. Box 217, 7500AE Enschede The Netherlands, 1–13. <http://essay.utwente.nl/64302/>.
- Shen, Huayu, Mengyao Fu, Hongyu Pan, Zhongfu Yu, and Yongquan Chen. 2020. “The Impact of the COVID-19 Pandemic on Firm Performance.” *Emerging Markets Finance and Trade* 56 (10). Routledge: 2213–30. doi:10.1080/1540496X.2020.1785863.
- Twinn, Ian, Qureshi Navaid, Daniel Sebastian Perea Rojas, and Maria Lopez Conde. 2020. “The Impact of COVID-19 on Airports: An Analysis.” International Finance Corporation (IFC), 3. [https://www.ifc.org/wps/wcm/connect/26d83b55-4f7d-47b1-bcf3-01eb996df35a/IFC-Covid19-Airport-FINAL\\_web3.pdf?MOD=AJPERES&CVID=n8l9pkG](https://www.ifc.org/wps/wcm/connect/26d83b55-4f7d-47b1-bcf3-01eb996df35a/IFC-Covid19-Airport-FINAL_web3.pdf?MOD=AJPERES&CVID=n8l9pkG).
- Unido. 2020. “Impact Assessment of COVID-19 on Thai Industrial Sector.” United Nations Industrial Development Organization (UNIDO), Inclusive and Sustainable Industrial Development (ISID): Partnering for Prosperity, no. June. [https://www.unido.org/sites/default/files/files/2020-06/Impacts\\_of\\_COVID19\\_on\\_Thai\\_industrial\\_sector\\_0.pdf](https://www.unido.org/sites/default/files/files/2020-06/Impacts_of_COVID19_on_Thai_industrial_sector_0.pdf).
- United Nations. 2020. *Impact of the COVID-19 Pandemic on Trade and Development, Transitioning to a New Normal*. Geneva: United Nations Conference On Trade And Development.