

# Global & Local Economic Review

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Cesare Pozzi\* - Umberto Monarca† - Giuseppe Surdi‡

**ELECTRIC VEHICLE EVOLUTION:  
ISSUES AND POLICY IMPLICATIONS**

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**Abstract**

Since the emergence of globalization and supply chain transformations, the automotive industry has been at the verge of an electric vehicle revolution.

The article discusses the main issues in the automotive industry deriving from the evolution of electric cars. Such evolution can restructure the global and local automotive value chain.

Environmental targets push electric vehicle (EV) development and deployment, and countries adopt a variety of policies to support this significant technological, industrial and societal transformation. COVID-19 stimulus packages and ordinary measures have spurred sustainable mobility and technological breakthroughs.

Regulations and industrial policies need to interplay in a comprehensive manner to address automotive sector transformations, which are customized for each country.

**JEL CLASSIFICATION:** L10; L52; L62; O25; O33.

**KEYWORDS:** AUTOMOTIVE; ELECTRIC VEHICLE; BATTERY; REGULATION; INDUSTRIAL POLICY.

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## **1. Automotive sector and EV revolution**

The automotive sector is a pillar sector of the modern economy, and it has significant impacts and spillover effects on postindustrial societies.

With globalization and supply chain transformations, the main automotive companies have adopted two significant strategies: the widespread diffusion of assembly plants in a growing number of relevant markets and the concentration of component suppliers in specialized areas. In these ways, industrial players have achieved significant advantages from the lower cost of production and have developed a new type of hierarchical demand control of a fragmented global supply chain, moving away from Toyota's rationalization and just-in-time trajectories of the 1990s.

These strategies have interplayed with emerging markets, especially China, and the increasing competition of Asian automotive manufacturers. In 2019, China was the largest automotive market in the world, with 21 million new car registrations in addition to the 75 million sold worldwide, and the largest car manufacturer, producing 21.3 million cars, accounting for 26.3% of worldwide production. In this new context, the US and Japan have substantially maintained their production levels, while in the European Union, where production has declined in almost every country, only Germany has shown growth in this market, with a constant expansion of automotive production over the last twenty years.

In this way, the automotive industry affects a relevant part of each nation's technological and production systems. In the European Union, for instance, the auto industry at large accounts for 13.8 million jobs: 3.5 million direct and indirect jobs in manufacturing, among which 2.6 million involve the direct production of motor vehicles, accounting for 8.5% of total European employment in manufacturing, 4.5 million in sales and maintenance and 5.1 million in transport (European Commission, 2020); the auto sector is also the

main private R&D investor in the European Union, investing 61 billion annually, accounting for 29% of total spending in the sector (ACEA, 2019).

These simple data provide evidence that the analysis of the “industry of industries” and its technological and organizational changes is still crucial.

Thirty years later, “The Machine That Changed the World” was published in 1991, and the automotive industry was going through a structural change quite different compared to the results of the 5-year-long MIT study.

Technological breakthroughs in the automotive sector have a potentially enormous impact on our industrial systems and societies; in particular, the electric vehicle (EV) revolution can not only redefine this specific sector but also a consistent part of our economies.

The automotive sector, which relies on internal combustion engines (ICEs), is currently characterized by a large number of components, and as a consequence, this sector also includes the markets and industries of these components: for an ordinary vehicle, approximately 10,000 specific elements need to be assembled. In particular, electric engines need fewer parts than do ICEs, and they have the highest well-to-wheel efficiency compared to all current possible alternatives (Wanitschke e Hoffmann, 2019): an electric engine with 200 components in its drive train involves considerably less work than does an internal combustion engine that counts approximately 1,400 components (engine and transmission) (Friedrich Ebert Stiftung, 2015).

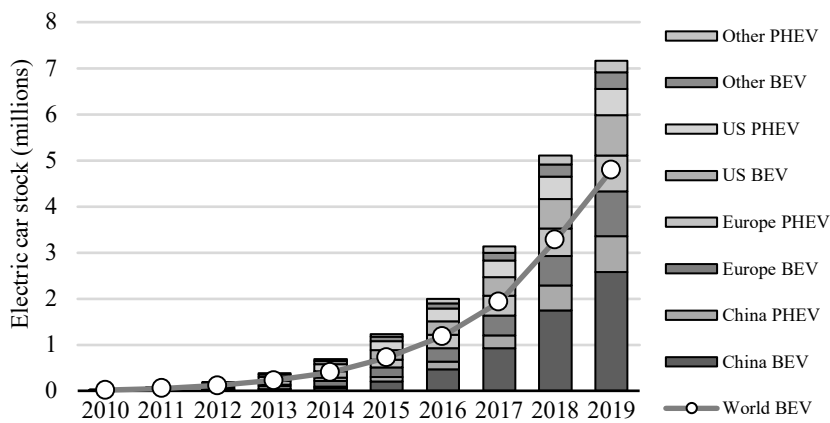
The core technology of EVs, the battery, is still evolving, while it accounts for 30 to 35% of the total cost of production at the vehicle level (Fraunhofer ISI, 2020). According to Bloomberg New Energy Finance (2020), by the mid-2020s, in most auto segments, price parity between EVs and internal combustion vehicles will be reached, beginning with large cars in Europe.

Ecological issues (Cassetta and Pozzi, 2017), regulation prospects and Tesla industrial and financial examples show the possibility of a radical change in the automotive, transport and energy sectors that alarms incumbent leaders both for market reasons and for more general reasons.

Electric cars in 2019 registered a 40% increase compared to 2018, even if they accounted for only 1% of global car stocks and 2.6% of global car sales (IEA, 2020). Even after the COVID-19 global outbreak, the Bloomberg New Energy Finance forecasted that in 2022, there will be 500 EV models available in the world and that in 2040, 58% of new car sales will be electric: in 2019

only, automakers launched 143 new electric vehicles, 105 battery electric vehicles (BEVs) and 38 plug-in hybrid electric vehicles (PHEVs).

**Figure 1. Global electric car stocks, 2010-19.**



Source: IEA (2020).

According to McKinsey (2020), the lithium-ion-battery market for EV passenger cars grew by 17 percent in 2019, and battery-cell manufacturers have been increasing their production capacities, with an increasing number of joint ventures in the battery industry.

## 2. Electric vehicle evolution: issues and implications

The expected impressive development of battery electric vehicles (BEVs) is clearly connected to the declining internal combustion engine (ICE) configuration of the automotive sector. Stakeholders' strategies underpin the forecast of an unavoidable transition from ICEs to BEVs: last November, Volkswagen announced 86 billion dollars of investment in electric vehicles and other new technologies over the next five years and plans to release 80 new electric car models by 2025.

According to Cassetta and Pozzi (2019), the forecast evolution of EVs otherwise has several implications and some possible feedback that can affect the evolution itself. For example, lithium-ion batteries are the dominant

technology of EVs, but they are characterized by a scarcity of raw materials, particularly cobalt: a growing global demand for cobalt will face, on the supply side, extraction capacity constraints in the coming years. In the absence of significant technological progress, the rate of EV diffusion may be less intense than currently estimated. Even if lithium-ion-battery-pack prices fell 87% from 2010 to 2019 (Bloomberg, 2020), only the introduction of new chemical processes, new manufacturing techniques and simplified pack designs will guarantee the necessary progress. A technological breakthrough in the battery sector may prevent raw material scarcity, reduce production costs and drastically cut recharge time.

Sharing mobility and self-driving cars, conversely, can reduce the demand for new cars, hampering the profitability of EV investment (Spieser et al., 2014). A study of principal US cities indeed has estimated that each car-sharing vehicle on the road helps avoid or delay 19 vehicle purchases (AlixPartner, 2020).

Moreover, infrastructure mobility needs to be adapted to EV transformation: regulation choices (Choi et al., 2018) and investment aspects are crucial, while technical features do not seem critical. Even in the absence of an electrical infrastructure for long distances, the fact that the vast majority of distance in km/vehicle is covered in urban areas makes BEV diffusion possible in the immediate future: according to the National Household Travel Survey, 90% of US trips cover less than 30-km distances.

Regardless, national and international institutions and policymakers are pushing the automotive sector toward more pressing ecological objectives, with regulations for lower emissions and incentives for green vehicles.

In this context, there will be multiple impacts on the supply chain. The ICE supply chain will probably encounter trouble: the EV revolution can eliminate current suppliers that produce useless elements for electric cars. A significant excess production capacity in assembly plants can arise since assembly times for EVs are much shorter than those for ICEs, and the life expectancy of electric cars is longer than that of traditional ones (AlixPartners, 2017): the main consequence will be the downsizing or closing of factories not involved in the recent plans of principal automakers. The retail network will integrate car sales with electric recharge services, while the maintenance sector will be

affected by the lower maintenance requirements and lower wear of EV components.

Therefore, the ongoing transformation of the automotive sector will affect several countries. The European Union is probably one of the most vulnerable areas, even if European ecological targets are becoming increasingly rigorous. The European automotive sector experienced a slowdown in 2018-2019, and the impact of the coronavirus pandemic on the automobile market has been unprecedented: there was a 25% decrease in new passenger car registrations from January to November 2020 (ACEA, 2020). The 196 automobile engine production and assembly plants within the European Union (EU27), which clearly do not include automotive suppliers, have been hit hard by the COVID-19 crisis.

COVID-19 may result in the strengthening of the selection process of less-competitive firms along the automotive chain (Sangalli, 2020).

**Table 1. New passenger car registrations in the EU by market and by manufacturer.**

<b>SELECTED COUNTRIES</b>	<b>Jan-Nov 2020</b>	<b>Jan-Nov 2019</b>	<b>% Change 20/19</b>
FRANCE	1,463.795	2,003.085	-26.9
GERMANY	2,606.284	3,323.878	-21.6
ITALY	1,261.802	1,776.501	-29.0
SPAIN	745.369	1,152.395	-35.3
<b>EUROPEAN UNION (EU)</b>	<b>8,911.131</b>	<b>11,963.059</b>	<b>-25.5</b>
<b>MANUFACTURER</b>	<b>Jan-Nov 2020</b>	<b>Jan-Nov 2019</b>	<b>% Change 20/19</b>
VW Group	2,281.473	3,003.395	-24.0
PSA Group	1,368.808	1,999.523	-31.5
RENAULT Group	1,023.934	1,399.461	-26.8
HYUNDAI Group	634.865	791.535	-19.8
FCA Group	587.583	819.637	-28.3
BMW Group	579.997	699.377	-17.1
DAIMLER	561.182	731.086	-23.2
TOYOTA Group	506.085	599.803	-15.6
FORD	447.924	652.098	-31.3
VOLVO CAR CORP.	197.386	238.169	-17.1
NISSAN	187.136	262.282	-28.7
MAZDA	105.710	182.267	-42.0
MITSUBISHI	80.677	113.579	-29.0
JAGUAR LAND ROVER Group	61.038	94.803	-35.6
HONDA	44.359	66.043	-32.8

Source: ACEA (2020).

EV development will probably increase the vulnerabilities of the most exposed countries, such as Italy: Italian automotive component suppliers are indeed highly specialized in the traditional automobile sector, and only a limited number of these firms have participated in projects for electric or hybrid engines. The potential industrial change in electric mobility can negatively affect the 2,190 companies of the automotive component supply chain in Italy, which currently generate a total turnover of almost 46.5 billion euros and have more than 156,000 employees (Zirpoli, Moretti 2018).

Key global players, instead, are localizing the production of vehicles and components in target markets: Tesla has constructed a new plant in Shanghai, and it is building one in Germany, while Toyota and Volkswagen have announced EV plants in China. Asian manufacturers, instead, are developing battery production capacities in Europe: the Chinese leader CATL is establishing a factory in Germany, and other Asian producers are establishing factories in Hungary and Poland. Asian battery manufacturers plan to address their significant role in the European EV supply chain, taking advantage of the geographical proximity to original equipment manufacturers (OEMs) and the presence of skilled workers. Tesla is building a new gigafactory near Berlin, where batteries, battery packs and powertrains will be produced and where Model Y will be assembled.

International competition in EV assembly and parts manufacturing industries is increasing and can have crucial consequences for the automotive sector and economic prosperity of several countries, especially those in the European Union.

### **3. Targets, regulation and industrial policy**

In industrial countries, sustainability is an increasingly important collective goal; the idea of a climate-neutral economic system that avoids ecological collapse is spreading, and renewable energies and electric vehicles are key technologies in the push toward a zero-carbon world. The European Union, for example, has developed a green growth strategy, the so-called European Green Agreement, to help Europe become the world's first zero-emission continent by 2050.

To achieve such ambitious goals, an overall and long-term vision is necessary to identify a sustainable path, both from ecological and socioeconomic points of view (Cassetta e Pozzi, 2016). Electric vehicle

diffusion, for instance, will increase electricity demand, and as a consequence, only the strategic planning of the overall energy system and power generation mix, based on a progressive increase in renewable energy sources, can guarantee EVs' contribution to low-carbon energy systems (Bellocchi et al., 2019).

In the EV context, moreover, regulations and industrial policies have to boost technological breakthroughs and redesign automotive manufacturing and supply chains.

Regulatory policy can require more efficient vehicles or a growing share of EV production for automakers, such as the EU emission standard or Chinese New Energy Vehicle mandate policy (IEA, 2020), or set the phasing out of vehicles with internal combustion engines to 2050, as has already been announced by several countries. Phaseout regulation pursues not only environmental goals but also competitiveness targets: this policy is an incentive for EV industrial upgrading by countries that want to develop export capacity, while it promotes automotive industrial renewal in countries with existing international competitiveness (Meckling, Nahm 2020).

Regulations for vehicle and charger standards, as prerequisites for EV adoption, are also crucial for the development of the market and industry.

Ecological taxation or fiscal incentives for vehicle purchases, conversely, are likely to gradually spur electric vehicle deployment: in almost all car markets, there are forms of subsidies or tax reductions for the purchase of an individual or company electric car. These incentive schemes are crucial in terms of their affects on customer behavior (McKinsey, 2020): after the Chinese government decreased subsidies in 2019, the EV market declined by 31 percent in the second half of the year, while in the United Kingdom, after subsidies for hybrids were stopped, sales of PHEVs plunged by 15 percent.

The COVID-19 crisis has even emphasized purchase subsidies at the national or local level as a stimulus instrument; countries that were planning a phase out of or reduction in subsidies, such as China, are now extending their subsidy schemes. Stimulus packages include measures to support the automotive industry and to boost electric vehicle sales: the German government, for instance, announced in November 2020 that it would increase subsidies for the purchase of electric cars and extend them to the end of 2025. Moreover, a significant part of an 8-billion-euro French plan for the automotive industry will support the national manufacturing of electric and



hybrid cars and subsidize their buyers, while the extension of Italian subsidies will probably be reviewed along with expected recovery measures regarding electric and sustainable mobility.

Among the industrial policies aimed at stimulating and facilitating the development of green technologies (Rodrik, 2015), public procurement schemes (e.g., municipal EVs for sharing mobility) showcase the technology to the public and allow the industry to foster economies of scale (IEA, 2020).

Industrial policy strategy can include multiple and mutually enforcing options: targeted measures for green technologies, state aid for electric battery research, direct support measures for the production of EVs and EV components to renew the automotive manufacturing and supply chain, such as European co-funding to build giant battery factories, public investment in charging infrastructure, state-guaranteed loans and/or public co-funding for specific technological initiatives or toward corporate fleets for bulk procurement of electric cars.

In the US, for instance, Tesla Motors was directly supported by a Department of Energy loan for 465 million dollars to develop EVs, and a manufacturing facility in Fremont, California, and EV purchases have been sustained by federal and state tax credits, clean energy credits or other government incentives offered by some state environmental agencies. China addressed the EV sector as one strategic emerging industry, and according to the “Made in China 2025” plan, it is considered a key development area: electric vehicles will continue to receive government support during the 14th Five-Year period of 2021–2025. In the European Union, according to Marin (2020), industrial policy efforts should be focused on creating an EV battery manufacturing industry: in this direction, the European Commission (EC) has promoted the European Battery Alliance, a cooperation platform with interested Member States, the European Investment Bank and industrial stakeholders, to develop a European battery value chain, and the EC has also launched BATTERY 2030+, a long-term research program focusing ultrahigh-performance batteries.

Regardless, a country-by-country approach to address the evolution of the EV automotive sector is needed: a comprehensive strategy that is appropriate for all countries does not exist. Each country is characterized by a specific automotive industry and supply chain design, different levels of EV

technological progress and cost competitiveness of EV powertrains and the current presence of game-changer players, such as Tesla.

Each country-specific EV strategy must address environmental goals along with industrial change objectives, involving all key stakeholders.

#### **4. Conclusions**

The speed and aftermath of the EV revolution of the automotive industry are currently unpredictable. Regardless, global and local automotive value chains will almost certainly be deeply restructured.

Climate-neutral policies support the development of sustainable mobility and electric vehicle diffusion.

Each country adopts regulatory policies, incentive schemes and industrial policies to achieve technological breakthroughs, expand the EV market and support competitiveness in the automotive industry.

Each country must develop its own industrial and regulation strategy to address the technological, industrial and societal EV revolution, taking into account the evolution of the international automotive supply chain.

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*Electric vehicle evolution: issues and policy implications*

Abida Shahzadi<sup>1</sup>, Muhammad Rizwan Yaseen<sup>2</sup> and Sofia Anwar<sup>3</sup>

**EFFECT OF GLOBALIZATION ON THE KNOWLEDGE  
ECONOMY THROUGH GOVERNANCE, PEACE AND  
STABILITY IN LOW-INCOME COUNTRIES**

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**Abstract**

This study analyzes the effect of globalization on the knowledge economy (KE) through the mechanisms of peace and stability. The emphasis on low-income countries responds to the gap in recent research on KEs in such countries. The indirect effect of globalization on the knowledge economy is estimated by means of the 3SLS method with data for 16 low-income countries from 1996 to 2015. In the first stage, peace and stability are linked with the globalization index. In the second stage, peace and stability are linked with general, economic and institutional governance indices. Finally, governance is linked to measures of the knowledge economy. The results show a positive relationship between globalization and peace in the first stage. Positive relationships are found between globalization and economic governance, institutional governance and general governance in the second stage. There is a negative effect of globalization on the knowledge economy through education, ICT and innovation, but there is a positive effect through economic incentives. Globalization benefits the knowledge economy by encouraging social change via political stability and peace, which promote good governance. Therefore, this study recommends that low-income countries persist and continue to integrate into the global economy.

**JEL Classification:** F1; F6.

**KEYWORDS:** GLOBALIZATION; KNOWLEDGE ECONOMY; LOW-INCOME COUNTRIES; PEACE; STABILITY.

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## **1. Introduction**

Globalization describes the process of the opening of and building interconnections across the world (Rooney, 2005). This opening and interconnection have been given driving force by the need to loosen access to financial and trade markets and by improvements in information and communication technology (ICT), which have produced a knowledge economy (Andrés et al., 2015).

Mazrui (2001) explained three different ways in which globalization is interpreted: as economic interdependency across large distances; as data accessibility and movement across vast distances; and as a shrinking of the world into a global village. He stated that two types of globalization can be recognized: economic and social globalization. Globalization is a process whereby trade liberalization has an increasing impact at the national level as organizations utilize new, less expensive and more dependable methods of communicating and working across knowledge, social and geographical boundaries (Brown et al., 2008).

According to the Leitch Review of Skills in the UK, high global economic competition is a key lever for growth and equality. Skills are presented as the key driver of this phenomenon (Leitch, 2006; Brown et al., 2008). The benefits of globalization are higher in a knowledge economy.

According to a report of the World Bank and OECD (OECD, 2002; The World Bank, 2007; Peters, 2008; Weber, 2011), research on the knowledge economy developed into an important field in the late 1990s. It is currently firmly established that innovation and technological knowledge are long-run factors in economic prosperity (Lerner, 2009). Governments play a vital role in the formation of knowledge. Once a favorable framework for a knowledge economy is implemented, good governance can attract inflows of FDI and motivate national or local investment. According to Chandra and Yokoyama 2011, the most important challenge in developing a knowledge economy is utilizing knowledge for growth by providing an empowering environment for exceptionally qualified human resources, a competitive educational system, a better information technology (ICT) infrastructure and a scientific foundation in terms of the skills needed for innovation.

There are few studies (Amavilah et al., 2017; Carnoy & Castells, 2001; Dunning, 2002) on the knowledge economy and globalization in different regions. No studies have calculated the indirect relationship of the knowledge economy and globalization through the mechanisms of governance, peace and

stability for low-income countries. Measuring globalization and the knowledge economy is very important for policy makers because low-income countries face many challenges in terms of economic development. Therefore, it is important to evaluate the connection of the knowledge economy with globalization so that policy measures can be taken to improve the situation for each country. Therefore, this study aims to measure the relationship of the knowledge economy (KE) in low-income countries with globalization through the mediators of governance, peace and stability by means of 2SLS and 3SLS regression.

The main questions are as follows: Is there any association between stability and globalization? How does such an association influence governance and affect the KE in low-income countries? There is an enormous gap in the available literature regarding the association between globalization and the KE in low-income countries.

The current study is organized in three sections: a literature review, the methodology and results, and a discussion. The next section presents the literature review, followed by the methodology section, the discussion of the results, and the conclusion.

## **2. Literature**

A review of the literature helps to synthesize ideas to theorize the relationship between globalization and the knowledge economy. It also helps provide the basis for the models.

### *2.1 Peace, Stability and Globalization*

Globalization has increased over the past decade. The exchange of data, thoughts, innovations, capital, products, administrations, finance and individuals between countries has led to interdependencies among countries. This association has raised challenges for governments seeking to control and direct their economies. Economic integration, a marker of globalization, has required harmonization of national strategies because of the development of interlinked markets and economies (Esty & Ivanova, 2003).

Globalization is fundamental to peace and stability and subsequently to governance (Asongu et al., 2016), with control of corruption being a key feature of good governance (Kangoye, 2013). There are economic, social and political measurements of globalization. Trade openness is used as a proxy of



economic globalization and has been found to decrease corruption (Bonaglia et al., 2001). In addition, ideas related to governance (political, economic and institutional) have been utilized in past studies. High-income nations are more worried about social and political measurements of globalization and subsequently profit from global improvements on corruption indicators (Lalountas et al., 2011). On the other hand, low-income nations are more focused on economic measurements of globalization; thus, the incidence of corruption is passed over while internal ethnic conflicts are amplified. Ethnic conflicts proliferate; however, nonethnic conflicts decrease.

Globalization (especially financial and social globalization) is related to internal ethnic conflicts. Ethnic conflicts proliferate due to social globalization, while nonethnic conflicts decrease. However, developing countries are also hurt by unfair terms of trade. Trade, through its influence on peace and stability, can be as beneficial as it is damaging when favorable terms of trade for development are on offer (Olzak, 2011).

There are ambiguous partial and joint effects of globalization and conflicts on economic performance due to the complexity of the phenomena. Not all conflicts lack legitimacy, nor are all of them violent, and questionable decisions have been made even in stable and peaceful economies (Tidwell and Lerche, 2011).

Tjiptoherijanto (2006) asserted that the effects of globalization on developing and industrial nations, particularly in Asia and Africa, are of various natures. The impacts of globalization have been unequally distributed, with poor economies in a disadvantageous position because of the development of low-skilled workers and the regime governing intellectual property rights (Griffin, 2003).

Therefore, it can be included from the above literature that there is a relationship between peace and stability, on the one hand, and globalization, on the other, that will be analyzed in this study.

## *2.2 Knowledge Economy, Governance, Peace and Stability and Globalization*

The term knowledge policy refers to political mechanisms for achieving the goals of knowledge production individually and socially. According to Stehr (2012), the focus of policy in a society influenced by knowledge is termed "knowledge politics". Stehr (2015) argued that the purpose behind the development of knowledge policies is to incorporate new types of knowledge, leading to a reduction in basic and applied research differences. The high

capacity and speed of digital information flows amplify worries over possible unfavorable effects or increased uncertainty and risk. They also expand the economic, political and social importance of knowledge and the desire of governments to make knowledge accessible alongside globalization while helping further establish the role of scientific experts in modern society (Rooney et al., 2003).

For KE policy, globalization and ICT are two primary factors. ICT and the globalization revolution are viewed as foundational aspects for the improvement of knowledge economies. These factors are drivers of communication and transmission in KEs (Mansell and Wehn, 1998; Stiglitz, 2000). Knowledge economies are basic economic aspects of globalization and incorporate capital, trade and labor (Stiglitz, 2003). The ICT revolution is commonly cited as among the foremost globalizing trends (Soete, 2002). Organizations such as, for example, the OECD, have strongly emphasized the dominant role of ICT in the knowledge economy. Different reports from global policy institutions have also called attention to the fact that ICT produces cultural, political, economic, and social change (Ahmed, 2007).

The association between the knowledge economy and governance is observable but weak, according to Andrés et al. (2015). It is likewise challenging to measure because of the ambiguity of the constructs. Khan (2007) argued that in the liberal economic view, good governance involves “abilities that make markets efficient by decreasing transaction costs”. In this context, there are two main reasons that governance is vital for economic development: 1) Economic development is driven by efficient markets, regardless of whether output grows. Moreover, 2) good governance stimulates economic development by improving productivity.

This researcher found that “good governance has a positive and significant impact on growth, regardless of the proxy used for governance” and that the benefits of good governance are greater for low-income countries than for developed countries (Amavilah, 2009). Kraay et al. (1999, 2002, 2003) contended that this outcome might be rationalized as good governance promoting development, but in the case of state capture, governance and institutions do not stimulate economic growth, disrupting the “virtuous circle” (Khan, 2010).

In light of the above literature, the effect of globalization on the knowledge economy through the mechanisms of governance, peace and stability is analyzed by using the following methodology.

### 3. Data and Methodology

Table 1 defines all variables used to evaluate the relationship between the knowledge economy and globalization. Principal component analysis (PCA) is used to formulate the knowledge economy and governance indices (Asongu, 2013, 2015; Andrés et al., 2015). The globalization index includes four dimensions, i.e., economic, political, social and environmental, calculated by the equal weight method. Last, control variables are defined.

**Table 1. Variable definitions**

Variables	Symbols	Definitions	Data Sources
1. Knowledge Economy Index			
1.1: Education			
School Enrollment at Primary Level	SEP	Primary school enrollment (% of gross)	World Development Indicators (WDI) 1996-2015
School Enrollment at Secondary Level	SES	Secondary school enrollment (% of gross)	
School Enrollment at Tertiary Level	SET	Tertiary school enrollment (% of gross)	
Education in KE	Edutex	First PC of SEP, SES & SET	
1.2: Infrastructure and Information			
Internet Users	Net	Internet users (per 100 people)	WDI 1996-2015
Cellular Mobile Subscriptions	Mob	Mobile subscriptions (per 100 people)	
Telephone Lines	Tel	Telephone lines (per 100 people)	
Information & Communication Technology (ICT) In KE	ICTex	First PC of Net, Mob & Tel	
1.3: Economic Incentives			
Financial Activity (credit)	Perbof	Private domestic credit from banks and other financial institutions	Financial Development and Structure Dataset
Interest Rate Spreads	IRS	Difference between lending rate and deposit rate (%)	WDI 1996-2015
Economic Incentives in KE	Creditex	First PC of Perbof and IRS	
1.4: Innovation			
Scientific & Technical Publications	STJA	Number of scientific and technical journal articles	WDI 1996-2015
Trademark Applications	R&D	Research and development expenditures	
Innovation in KE	Innovex	First PC of STJA and R&D (% of GDP)	
2. Governance			

2.1: Economic Governance Index			World Governance Indicators
Government Effectiveness	GE	Public services quality, the quality and independence from political actions of the civil service, the quality of policy making and application, and the integrity of governments' commitments to such policies	
Regulation Quality	RQ	Capacity of the government to develop and implement regulations and policies that promote development of private sector development	
Economic Governance	EG	First PC of GE and RQ. The capability of government to design & implement policies and to deliver services	
2.2: Institutional Governance			
Rule of Law	RL	The extent to which individuals have confidence in and obey rules as well as the quality of contract implementation, police, property rights, and courts and the probability of violence and crime	
Corruption Control	CC	The degree to which public power is implemented for private benefit	
Institutional Governance	IG	First PC of RL and CC. The esteem of citizens for the state institutions that administer interactions among them	
2.3: General Governance			
General Governance	GG	First PC of PS, VA, GE, RQ, RL and CC	
3. Globalization Index			KOF Globalisation Index
3.1: Economic Globalization	EG	Trade globalization and financial globalization	
3.2: Political Globalization	PG		
3.3: Social Globalization	SG	Interpersonal globalization, information globalization and cultural globalization	
3.4: Environmental Globalization	ENG	Ecological footprints vs. bio capacity (GHA)	Ecological Footprint Network
4. Political Stability/No Violence (Dependent Variable)	PS	The probability that the government will be destabilized by nondemocratic and violent means	WDI 1996-2015
5. Control Variables			
Inflation	CPI	Consumer price index (annual %)	

Government Expenditure	GFFCE	Government's final consumption expenditure (% of GDP)	
Economic Prosperity	GDPG	Gross domestic product growth (annual %)	

Data were taken from the World Bank Indicators (WDI), World Governance Indicators (WGI), KOF and the Ecological Footprint Network for 16 low-income countries for the period 1996–2015.

This study focuses on four hypotheses and applies a 3SLS regression to calculate and examine them. In the first stage, the independent variables are linked with the globalization index (GI). In the 2nd stage, stability and peace are linked with three governance variables: GGI, EGI, and IGI. Last, we link governance to measures of the knowledge economy: Edutex, ITex, Ivex, and Ctex (see footnote 1). Negative as well as positive relationships exist between the peace and stability indicators and the knowledge economy through the mechanism of governance. The globalization index is constructed with the help of economic, social, political and environmental dimensions using the equal weight method.

### *3.1 Hypotheses*

The current study uses three key stages to demonstrate that peace and stability induced by globalization affect governance and then the knowledge economy. The first stage reports that peace and stability are induced by globalization and are also an instrument for governance. Globalization-induced stability is generated by the development of good governance. Governance is thus instrumented with globalization-induced stability in the second-stage regression. Three variables are deployed for this application: the EGI<sup>4</sup>, IGI and GGI as a function of GLOBGI (see footnote 1). The third stage of the estimation procedure deals with the association between the knowledge economy and governance. The rationale behind this complete estimation process is summarized in the following four hypotheses:

**Hypothesis 1:** KE (measured by education), influenced by globalization-induced peace, has an impact on governance.

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<sup>4</sup> Economic governance index=EGI, institutional governance index=IGI, general governance index=GGI, GLOBGI=globalization-induced peace and stability, education=Edutex, information & infrastructure=ITex, innovation=Ivex, and economic incentives=Ctex.

**Hypothesis 2:** KE (measured by ICT), influenced by globalization-induced peace, has an impact on governance.

**Hypothesis 3:** KE (measured by economic incentives), influenced by globalization-induced peace, has an impact on governance.

**Hypothesis 4:** KE (measured by innovation), influenced by globalization-induced stability, has an impact on governance.

### 3.2 Knowledge economy indicators

The results of PCs with eigenvalues greater than one are represented in Table 2.

**Table 2. Results of PCA for KE indicators**

KE pillars	Component matrix (loadings)			First PC	Eigenvalue	Indices
Education	SEP	SES	SET	0.61	1.81	Edutex
	0.26	0.69	0.68			
Information & infrastructure	Net	Mob	Telephone	0.73	2.20	ITex
	0.64	0.58	0.50			
Innovation system	STJA	R&D expenditures		0.58	1.17	Ivex
	0.71	0.71				
Economic incentives	Private credit	Interest rate spread		0.56	1.13	Ctex
	-0.70	0.70				

Note<sup>5</sup>: See footnote 2.

### 3.3 Governance indicators

Table 3 presents the results of the first PCs for which eigenvalues are more than one: the general governance index (GGI), economic governance index (EGI), and institutional governance index (IGI).

<sup>5</sup> Etex: First PC of primary, secondary and tertiary school enrollments.

ITex: First PC of mobile, telephone and internet subscriptions.

STJA: Scientific and technical journal articles.

Ivex: First PC of STJA and R&D expenditures.

Ctex: First PC of private domestic credit and interest rate spread.

**Table 3. Results of PCA for governance indicators**

Principal components	Component matrix (loadings)						Proportion	Eigenvalue
	RQ	GE	RL	CC	VA	PS		
1st PC (GGI)	0.41	0.42	0.39	0.42	0.39	0.41	0.91	5.44
1st PC (EGI)	0.707	0.707	–	–	-	-	0.999	1.99
1st PC (IGI)	–	–	0.707	0.707	-	-	0.907	1.81

Note<sup>6</sup>: See footnote 3.

### 3.4 Estimation Technique

In light of the fundamental claim that globalization affects KE through the mechanism of peace and stability, which is further influenced by governance, the 3SLS empirical methodology is used by applying instruments in a panel fixed effects model. The three stages of the estimation strategy are as follows:

#### First-stage regression:

$$Stability_{it} = \alpha_0 + \alpha_1(Globalization) + \mu_{it} \dots\dots\dots (1)$$

where Stability denotes Political Stability/No Violence and Globalization is the authors' own index.

#### Second-stage regression:

$$Governance_{it} = \beta_0 + \beta_1(STABGI) + \mu_{it} \dots\dots\dots (2)$$

where Governance denotes the GGI, EGI and IGI and STABGI stands for globalization-influenced peace and stability.

#### Third-stage regression:

$$KE_{it} = \gamma_0 + \gamma_1(STABGI)_{it} + \gamma_2(EGISTABGI)_{it} + \gamma_3(IGISTABGI)_{it} + \gamma_4(GGISTABGI)_{it} + \gamma_5 X_{it} + \mu_{it}$$

KE is measured by ICT (*ITex*), education (*Edutex*), innovation (*Ivex*) and economic incentives (*Ctex*), and the vector of control variables (*inflation*, *government expenditure* and *economic prosperity*) is represented by *X*. STABGI is globalization-influenced stability, and EGISTABGI is economic governance associated with globalization index-influenced stability. IGISTABGI is institutional governance associated with globalization-

<sup>6</sup>First PC of RQ and GE; first PC of RL and CC.

influenced stability. GGISTABGI is general governance associated with globalization-influenced stability.

#### 4. Empirical Results

##### 4.1 First- and second-stage results

Table 4 represents the results of the first- and second-stage regressions. The significant positive effects of globalization on peace and stability are shown in Panel A. Globalization-influenced peace and stability positively affect governance (see Panel B). Namely, globalization-influenced peace and stability significantly affect all three dimensions of governance—economic, institutional and general (Amavilah et al., 2017; Andrés & Asongu 2013 and Beck et al., 2003).

**Table 4. First- and second-stage regressions**

Panel A:				
	1 <sup>st</sup> stage regressions	2 <sup>nd</sup> stage regressions		
	Dependent variable: Political stability/No violence	Dependent variable: Economic, institutional and general governance		
		Economic governance	Institutional governance	General governance
Constant	-1.5546** (0.500)	-8.923** (4.694)	-0.090** (0.040)	-8.923** (4.694)
Globalization index	0.0326** (0.0108)			
IVSTABGI		0.238** (0.1107)	0.0015** (0.000)	0.238** (0.1107)
Adjusted R <sup>2</sup>	0.850	0.903	0.936	0.903
Observations	304	304	304	304
No. of countries	16	16	16	16

Note<sup>7</sup>: See footnote 4.

<sup>7</sup>IVSTABGI: Globalization-influenced trade stability. IVEGISTABGI: Economic governance (EGI) associated with globalization index (GI)-influenced stability (Stab). IVEGISTABGI: Institutional governance (IGI) associated with globalization (GI)-influenced stability (Stab). IVGGISTABGI: General governance (GGI) associated with globalization (GI)-influenced stability (Stab).\*\*\* Significant at 10%. \*\* Significant at 5%. \* Significant at 1%.



Third-stage regressions: Exploring the four hypotheses

The results for the first hypothesis are depicted in Table 5. The hypothesis is accepted (Amavilah et al., 2017). Globalization-influenced stability, economic governance related to globalization-influenced peace and institutional governance linked with globalization-influenced peace negatively affect education (Edutex). General governance linked with globalization-influenced peace has a positive effect on Edutex.

**Table 5. Effects on education (Edutex)**

Constant	0.563** (0.273)	2.246** (0.741)	0.342* (0.079)	-0.238 09.58
IVSTABGI	-0.012** (0.006)			
IVEGISTABGI		-0.046** (0.016)		
IVIGISTABGI			-0.0001** (3.98E-05)	
IVGGISTABGI				0.014** (0.007)
Inflation	-0.015 (0.035)	-0.033* (0.005)	-0.033* (0.005)	0.073 (0.091)
Gov. expenditure	-7.54E-05 (0.000)	-6.26E-05 (0.000)	-6.2E-05 (0.000)	-0.0002 (0.0016)
GDPG	0.018** (0.008)	0.007* (0.001)	0.007* (0.001)	-0.018** (0.007)
Adjusted R <sup>2</sup>	0.95	0.99	0.99	0.95
Countries	16	16	16	16
Observations	304	304	304	304

Note: See footnote 4.

The results for the second hypothesis are given in Table 6. Globalization-influenced stability, economic governance associated with globalization-influenced stability, institutional governance associated with globalization-influenced stability and general governance associated with globalization-influenced stability negatively affect ICT (ITex).

**Table 6. Effects on ICT (ITex)**

Constant	-4.643* (0.223)	-4.303* (0.183)	-4.475* (0.179)	0.1515 (0.2418)
IVSTABGI	-0.005** (0.001)			
IVEGISTABGI		-0.004* (0.000)		
IVIGISTABGI			-1.03E-05* (2.38E-05)	
IVGGISTABGI				-0.005*** (0.0032)
Inflation	0.816* (0.001)	0.730* (0.042)	0.730* (0.042)	0.009 (0.043)
Gov. expenditure	0.0052* (0.000)	0.005* (0.000)	0.005* (0.000)	0.0003 (0.000)
GDPG	0.002 (0.003)	0.001 (0.001)	0.0014 (0.001)	0.005 (0.004)
Adjusted R <sup>2</sup>	0.86	0.84	0.84	0.97
Countries	16	16	16	16
Observations	304	304	304	304

Note: See footnote 4.

Table 7 presents the results of hypothesis 3, for which the alternative hypothesis is accepted. A positive significant relation is found between the variables (Alesina et al., 2000; Rodrik & Subramanian, 2009).

**Table 7: Effects on economic incentives (Ctex)**

Constant	4.471* (0.452)	-38.27* (2.463)	1.983* (0.347)	0.926* (0.02)
IVSTABGI	0.032* (0.01)			
IVEGISTABGI		0.987* (0.05)		
IVIGISTABGI			0.002* (0.000)	
IVGGISTABGI				0.016** (0.006)
Inflation	-0.841* (0.04)	-0.851* (0.039)	-0.852* (0.039)	-0.03 (0.059)

Gov. expenditure	0.023* (0.003)	0.021* (0.003)	0.021* (0.004)	0.002 (0.003)
GDGP	-0.171* (0.011)	-0.175? * (0.011)	-0.175* (0.011)	-0.024*** (0.014)
Adjusted R <sup>2</sup>	0.76	0.87	0.87	0.86
Countries	16	16	16	16
Observations	304	304	304	304

Note: See footnote 4.

Finally, the results for hypothesis 4 are reported in Table 8. STABGI, EGISTABGI, and IGISTABGI are negatively associated with innovation. GGISTABGI is positively associated with innovation. The expected signs are found for most of the key variables. For example, education improves in the presence of economic prosperity (GDGP). Inflation (CPI) and government expenditure have a positive impact on ICT. Government expenditure is negatively associated with innovation, and GDGP is positively associated with innovation, as in other studies (Saxegaard, 2006; Asongu et al., 2016b).

**Table 8. Effects on innovation (Ivex)**

Constant	9.624* (0.988)	1.015* (0.05)	8.661* (0.793)	0.528* (0.06)
IVSTABGI	-0.181* (0.017)			
IVEGISTABGI		-0.821* (0.143)		
IVIGISTABGI			-0.004* (0.000)	
IVGGISTABGI				0.036* (0.008)
Inflation	-0.231 (0.164)	-0.185 (0.118)	0.025 (0.057)	0.47* (0.088)
Gov. expenditure	-0.06* (0.005)	-0.06* (0.008)	-0.026* (0.001)	-0.004* (0.000)
GDGP	0.433* (0.005)	0.401* (0.04)	0.202* (0.015)	0.029* (0.007)
Adjusted R <sup>2</sup>	0.90	0.60	0.88	0.87
Countries	16	16	16	16
Observations	304	304	304	304

Note: See footnote 4.

## 5. Discussion and conclusion

It has been found that globalization positively influences peace and negatively influences governance and the knowledge economy in low-income countries. Countries are involved in different ways in globalization, which, influenced by stability, promotes good governance; hence, ambitions to develop knowledge economies become realistic and attainable (Amavilah et al., 2016). The results are stimulating, as the positive effects offset the negative results; they prove that poverty and inequality may increase due to the positive association between globalization and peace. These results are consistent with those of Amavilah et al. (2016) and Kremer & Maskin (2007).

The results show that globalization-influenced stability depends upon governance. There are major policy implications based on the above results in regards to how low-income countries can obtain the benefits of globalization for knowledge economies. Peace and political stability should be improved to strengthen the knowledge economy (Asongu, 2014). It is important to upgrade the conditions for peace and governance in these countries (Anyanwu, 2012).

Here, some guidelines for future research are presented as follows. First, globalization, peace and stability can be measured by different methods. A second path for future research is to develop the model as a system of simultaneous equations.

According to the above discussion, there is a link between the determinants of the development of knowledge economies in low-income countries. In the first step, globalization was connected with political stability and peace. Second, the relationship between governance and peace was assessed. Finally, the effects of governance on the knowledge economy were examined. It was concluded that all coefficients in the three stages were economically related, although some showed nonsignificant results. It seems that globalization benefits the knowledge economy by encouraging social change via political stability and peace, which promote good governance and hence the knowledge economy. This study recommends that low-income countries persist and continue to integrate into the global economy. Low-income countries should take actions to increase globalization to strengthen their economies.

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*Effect of globalization on the knowledge economy through governance, peace and stability in low-income countries*

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## AN EMPIRICAL STUDY OF THE NEXUS AMONG IMPORTS, EXPORTS AND ECONOMIC GROWTH IN PAKISTAN

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### Abstract

In the age of globalization, economic growth through international trade has become one of the objectives included in the economic policies of all countries. This research endeavor explores the relationship between imports, exports and economic growth in Pakistan for the 1976-2015 period using Johansen cointegration analysis, a vector autoregressive model and a Granger causality test. The unit test indicates that the variables are stationary at first difference. There is no cointegration, and the VAR model is estimated, indicating a positive but statistically insignificant nexus among imports, exports and economic growth. The results of the postregression tests are satisfactory. The pairwise causality tests indicate unidirectional causality from exports to economic growth, validating the export-led economic growth hypothesis, and unidirectional causality from imports to economic growth, validating the import-led growth hypothesis. This study recommends export

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*An empirical study of the nexus among imports, exports and economic growth in Pakistan*

promotion measures, productive import measures and manufacturing sector diversification to boost economic growth.

**JEL CLASSIFICATION:** F40; F41; F43.

**KEYWORDS:** ECONOMIC GROWTH; IMPORTS; EXPORTS; VECTOR AUTOREGRESSIVE MODEL; GRANGER CAUSALITY.

## 1. Introduction

The politico-economic policies of all countries, in addition to other economic indicators, focus on GDP growth rate, exports, and imports and always strive to balance trade. Trade, the sum of exports and imports, is considered a pivotal determinant of the economic growth of any economy. Exports, the surplus sold in the international market after fulfilling domestic demand, are important because they reduce domestic market dependency, help maintain market share and profit, expand the market base, especially in foreign markets, and diminish market volatility, allowing for local industries to become potentially responsive to seasonal fluctuations, consumer behavior, changes in demand and economic dynamics domestically. Exports improve foreign exchange reserves, boosting national income and economic growth and uplifting overall welfare in terms of standards of living and quality of life. Importantly, the domestic supply gap, which involves the purchase of imports to fulfill domestic demand, improves the diversity of products for domestic customers, and technology imports boost investment and economic growth. However, a country can become dependent on the exporting country and squeeze its foreign reserves, sometimes leading to deficits in the balance between trade and payment (Bakari and Mabrouki, 2017).

Economies with enormous export shares enjoy fostered economic growth compared to those with low export shares (Marin, 1992; Thornton, 1996). Under the umbrella of export-led growth (ELG), advocated by Romer (1988), economies tend to specialize in goods that have a comparative advantage due to optimal resource allocations, leading to a favorable balance of payments and the dynamic trade gains from improved production through new technology adoption. Earnings from exports enable the importing of capital, and raw materials attract investment and boost economic growth. Foreign competition leads to innovation and efficiency in the industrial sector, and export promotion measures enhance the marginal return to scale (Nidugala, 2001; Kónya and Singh, 2006).

Furthermore, foreign trade multipliers boost production and open new employment opportunities. Foreign exchange through exports is used to finance the importing of goods (both consumer and capital goods), which enhances economic growth (Ramos, 2002). The importation of technology and innovative ideas increases labor productivity, which in turn improves export surplus. Such importation also leads to efficiency in resource allocation, economies of scale, improved marginal return to scale, enhanced

productivity, the transfer of technology and innovative ideas (Bhangwati, 1988; Krugman, 1984). Another hypothesis involves growth-led exports, suggesting unidirectional causality from economic growth to exports.

For both production and employment, exports are thought to be the main prime growth factor. Export promotion leads to economic growth on the grounds of the Keynesian multiplier effect, i.e., the foreign trade multiplier effect, and earned foreign exchange from exports is used to finance capital imports, which in turn boost economic growth. Export competitiveness leads to innovative production in domestic industries, economies of scale and technical progression, which make domestic industries competitive in the international market (Ramos, 2002).

Imports, which include raw material, consumption and capital good imports, positively affect economic growth (Esfahani, 1991; Ram, 1985). The import-led growth (ILG) hypothesis states that economic growth is also determined by imports, and the endogenous growth model suggests that innovative ideas, intermediate technology, capital imports, and the transfer of knowledge are necessary for uplifting the economic growth of a domestic economy. Enhanced trade openness, exports and imports lead to enhanced GDP and real income gained, which in turn heighten the exchange of goods and services in the international market, which is known as a virtuous circle (Din, 2004).

Certain economic and noneconomic determinants, such as exchange rates, relative prices, domestic and foreign economic affairs, cost of production, social and political stability and economic activities, affect import demand. It has been revealed that real income and the relative prices of commodities are considered to determine import demand on the grounds that greater economic activities increase real income and consumption and diversify the consumption pattern, which in turn increases import demand; thus, through the multiplier effect, import demand leads to rapid economic growth (Rivera-Batiz, 1985).

Imports of new technology, i.e., machines, equipment and innovative ideas, boost labor productivity over time. The import multiplier effect means that economic growth leads to an increase in imports, which leads to higher consumption and thus directly impacts economic growth (Uğur, 2008; Thangavelu and Rajaguru, 2004).

Since Pakistan achieved its independence, its trade balance has always been in deficit. Pakistan, a semi-industrialized developing economy, needs to promote its exports and extend its export base in the international market not

only to balance its trade and payments but also to obtain enough exchange earnings to achieve economic stability (Gov. of Pakistan, 2016). This study has significant importance because of its contribution to the trade literature in Pakistan. Furthermore, the literature on economic growth brings to light either the import-growth nexus or export-growth nexus, but this study is cumulative, focusing on the nexus among imports, exports and economic growth, i.e., to estimate the impact of trade, imports and exports on the economic growth of the country in a multivariate framework.

### **Main Objectives**

- To examine the nexus among economic growth, exports and imports.
- To put forward a recommendation for the concerned policymaking authority.

Based on the above objectives and the literature reviewed, the following research hypotheses are formulated:

***H<sub>0</sub> (1): There is a significant relationship between exports and economic growth.***

***H<sub>0</sub> (2): There is a significant relationship between imports and economic growth.***

## **2. Review of Literature**

In the 18<sup>th</sup> century, the father of economics, Smith (1776), and the 19<sup>th</sup> century economist, Ricardo (1817), emphasized international trade in the sense of specializing and exporting in the production of those commodities in which a country enjoys absolute advantage and comparative advantage, respectively. In the early 1960s, development economists intensified their energy spent investigating the trade-growth nexus, which has a direct bearing on GDP, the standard of living and the quality of life of society. Exports and imports are the prime factors that affect economic growth and development. Across the globe, different studies have been performed to conduct theoretical and empirical analyses of the nexus among economic growth, exports, and imports, and the estimated results are different due to the difference in the size of the economy, the composition of the economy and the policies implemented.

Regarding the trade-growth nexus, different schools of thought interpret scenarios differently. The first thought revolves around the export-led growth

(ELG) and import-led growth (ILG) hypotheses, stating that causality runs from exports to economic growth in the sense that exports improve productivity, economies of scale, production quality, capital investment, competitive prices, and employment creation and increases foreign exchange reserves, thus improving economic growth. Similarly, import-led growth occurs when productive goods are imported, which further accelerates economic activities; thus, economic growth is in the arena of the import-led growth (ILG) hypothesis. The export-led economic growth hypothesis was studied by Siliverstovs and Herzer (2006) in the Chilean economy through an investigation of the nexus among imports, exports, and economic growth. Hunjra *et al.* (2014) studied the same relation in Pakistan and observed a long-run relationship and a unidirectional relationship from imports and exports to GDP, confirming the export-led and import-led growth hypotheses. Muhammad *et al.* (2012) estimated trade-growth causality, indicated a long-run relationship and validated the ELG hypothesis in Pakistan. Some studies have confirmed the import-led growth (ILG) hypothesis in different economies. For example, Yuhong *et al.* (2010) studied trade-growth cointegration in China and confirmed the ILG hypothesis. Likewise, Ghali (2000) examined the export-to-growth ratio in Tunisia and confirmed the ELG hypothesis.

The second school of thought revolves around unidirectional causality running from economic growth to exports and imports and sometimes among trade variables from exports to imports and from imports to exports, referred to as growth-led exports (GLEs) and growth-led imports (GLIs), export-led imports (ELIs) and import-led exports (ILEs), respectively. The abovementioned hypotheses state that higher economic growth means higher productivity, lower per unit cost, economies of scale and exporting surplus, which lead to more exports abroad. Similarly, more exports fetch more reserves, which are in turn used to import productive and consumptive goods and services (export-led imports). Therefore, causality runs from growth to imports and among the trade variables from exports to imports, or vice versa. Saaed and Hussain (2015) highlighted causality running from economic growth to imports, a unidirectional causality between exports and imports and from exports to economic growth, confirming growth-led imports (GLIs), export-led imports (ELI) and export-led growth (ILG) in Tunisia, respectively. The same parameters were studied by Ramos (2002) for the Portuguese economy, which endorsed a causality from exports to imports but not vice versa.

The third school of thought indicates bidirectional causality running between trade variables and economic growth. Bakari and Mabrouki (2017) studied cointegration in the nexus between trade and economic growth. The results indicated no long-run relation but witnessed bidirectional causality from imports to economic growth and exports to economic growth, validating the ILG, ELG, GLI and GLE hypotheses in Panama. Khan *et al.* (1995) studied the nexus between trade and economic growth in Pakistan and confirmed bidirectional causality between export growth and economic growth. Similarly, in the same study area, Khan and Saqib (1993) examined the strong nexus between exports and economic growth. Hussain (2014) studied the cointegration of trade variables and economic growth. The results indicated no cointegration, but bidirectional causality was running between GDP and no causality between trade variables, verifying export-led growth in Pakistan.

The fourth school of thought highlights no causality, neither between trade variables (exports and imports) nor between trade variables and economic growth. In this regard, Hussain and Saaed (2014) studied the nexus among exports, imports, and economic growth in the Kingdom of Saudi Arabia. The results indicated that a long-run relationship existed, and the Granger test indicated unidirectional causality from exports to imports and from economic growth to imports and no causality from exports to economic growth and from imports to economic growth, validating the ELI and GLI hypotheses and invalidating the ELG and ILG hypotheses. Similarly, Shirazi and Manap (2004) studied the nexus among exports, imports, and GDP in Pakistan using cointegration and Granger causality relations. The study results indicated cointegration among variables, unidirectional causality from imports to GDP, and unidirectional causality from exports to GDP, but no causality was witnessed between exports and imports.

### 2.1. Pakistan Scenario

Pakistan, being among the top eleven emerging economies (Neil, 2007), stands as the 5th best market across the globe (Farwa, 2016). As per a 2016-17 economic survey, the contributions of the three economic sectors—agriculture, industry and services—were approximately 19.82%, 21.02% and 59.16%, respectively. During the first nine months (July-March) of 2016-17, the total exports recorded were US\$ 15.119 billion, with a decline of 3.06% compared to the same period in the previous year, encompassing food items

(US\$ 2,685.9 million), textiles (US\$ 9,278.9 million), petroleum (US\$ 139.2 million), other manufacturers (US\$ 2,274.1 million) and all other items (US\$ 740.5 million). The imports recorded during the same period were US\$ 38,503.8 million, with a growth rate of 18.7% compared to the same period during the previous year, encompassing food items (US\$ 4,528 million), machinery (US\$ 6,465 million), petroleum (US\$ 6,686.7 million), consumer durables (US\$ 3,470 million), raw materials (US\$ 5,610.9 million), telecom (US\$ 1,028.8 million), and all other items (US\$ 3,139.2 million). The economy of Pakistan showed an economic growth of 5.28% in 2016-17, which is its highest recorded growth rate in the last decade (Gov. of Pakistan, 2017).

### **3. Methodology**

#### *3.1. Data and Model Specification*

To investigate the nexus among exports, imports, and economic growth in Pakistan, annual time-series data for 40 years, from 1976 to 2015, were extracted from the World Bank development indicators (WBI). The data encompass macroeconomic indicators of the exports of goods and services (current US\$), imports of goods and services (current US\$) and real gross domestic product (constant 2010 US\$).

In analyzing the data, the time-series data analysis encompasses graphical analysis, a unit root test, optimal lag selection through a VAR model, a cointegration test, and the estimation of the model and Granger causality.

The empirical model used to study the nexus among economic growth, exports and imports in a number of studies, such as Bakari (2017), Khan *et al.* (2012), and Saaed and Hussain (2015), is given as follows:

$$GDPT = f(X, M) \quad (3.1)$$

$$\ln GDPT = \delta_0 + \delta_1 \ln(X)t + \delta_2 \ln(M)t + \varepsilon_t \quad (3.2)$$

where X is exports, M is imports,  $\delta_0$  is the constant term,  $\delta_1$  is the elasticity coefficient of exports,  $\delta_2$  is the elasticity coefficient of imports, and  $\varepsilon_t$  is the error term, which is assumed to be independent and normally distributed.

The next step is to test the variable series for unit root analysis to test whether the time series is stationary or not. The variable series is stationary when it is time-invariant in terms of the mean, variance and covariance. For this purpose, augmented Dickey-Fuller (1979) and Phillips Perron (1988) tests are used. The empirical model of the ADF test is given below:

$$\Delta Y_t = \gamma_1 + \gamma_2 t + \gamma_3 Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (3.3)$$

where  $Y_t$  is the test variable to be subjected to the unit root test,  $t$  is the trend variable,  $Y_{t-1}$  is the test variable's lag value,  $\Delta Y_{t-1}$  is the lag value of the dependent variable,  $\varepsilon_t$  is the pure white noise error term, and  $\gamma_3$  is the coefficient value of the variable series to be tested. The null hypothesis (the variable series is nonstationary) is tested against the alternative hypothesis (the variable series is stationary), given as follows:

Ho :  $\gamma_3 = (1 - \rho) = 0$  Data are unit roots

H1 :  $\gamma_3 = (1 - \rho) < 0$  Data are not unit roots

To check the cointegration between the variable series considered, the cointegration tests of Johansen and Juselius (1990) and Engle and Granger (1987) are used, assuming the null hypothesis of no cointegration and the alternative hypothesis of the existence of cointegration. The Johansen test has a comparative advantage over the EG test because it determines multiple cointegrating vectors, usually used for large sample sizes, and the variables must be integrated in the same order. If cointegration exists, then the next step is to estimate the vector error correction model (VECM), but in the case of no cointegration, the vector autoregressive (VAR) model is estimated.

In the case when there is no cointegration between variables, the use of VAR is suggested, the empirical model of which is given as follows:

$$\Delta Y_t = a + b Y_{t-1} + \sum_{i=1}^{n-1} c_i \Delta Y_{t-i} \quad (3.4)$$

The Granger causality test is used to determine the causality or the direction of the relation moving from one variable to another or vice versa when there exists a long-run relationship (Mehmood, 2013).

$$\Delta GDP_t = \sum_{i=1}^n \alpha_i \Delta GDP_{t-i} + \sum_{i=1}^n \beta_i \Delta X_{t-i} + \sum_{i=1}^n \gamma_i \Delta M_{t-i} + \varepsilon_t \quad (3.5)$$

$$\Delta X_t = \sum_{i=1}^n \alpha_i \Delta GDP_{t-i} + \sum_{i=1}^n \beta_i \Delta X_{t-i} + \sum_{i=1}^n \gamma_i \Delta M_{t-i} + u_t \quad (3.6)$$



$$\Delta M_t = \sum_{i=1}^n \alpha_i \Delta GDP_{t-1} + \sum_{i=1}^n \beta_i \Delta X_{t-1} + \sum_{i=1}^n \gamma_i \Delta M_{t-1} + vt \quad (3.7)$$

#### 4. Results and Discussion

This section covers the results and discussion of the nexus among economic growth, imports, and exports. The first step of any analysis is to determine the description of the variables considered. The results indicated that for the given study of 40-year time series, the mean GDP was 85,777.63 million US\$, the mean exports were approximately 12,247.43 million US\$, and the mean imports were approximately 18,897.75 million US\$.

**Table 4.1. Descriptive Statistics**

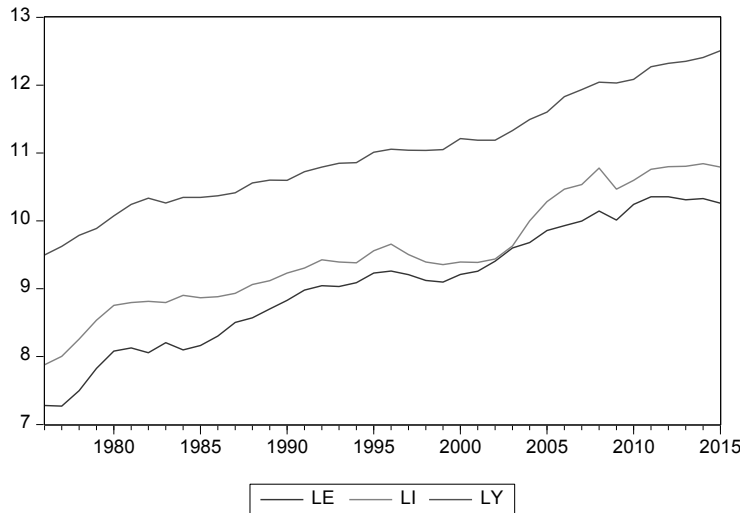
Variable	Observations	Mean	Std. Dev.	Min.	Max.
<b>Exports (\$M)</b>	40	12,247.43	9,687.102	1,438.288	31,433
<b>Imports (\$M)</b>	40	18,897.75	15,763.51	2,643.865	51,141
<b>GDP (\$M)</b>	40	85,777.63	72,572.16	13,338.48	270,556.1

Source: Authors' estimations from data

##### 4.1. Graphical analysis

Before an analysis of time-series data, it is mandatory to plot the variable series considered. According to Gujarati and Porter (2009), the analysis of data before subjecting it to graphical analysis can lead to negative results. The graphical analysis of the variable series indicates that GDP, exports and imports trend upward, as depicted in Figure 4.1.

**Figure 4. Trend analysis of the study variables**



**4.2. Unit root test**

Time-series data are often contained within the stationarity problem, which is why the next step is to subject the variables to a unit root test to examine whether they are stationary or not. Second, a unit root test is also conducted to determine the order of integration among the variables under study. Augmented Dickey-Fuller (1979) and Phillips Perron (1988) tests are used.

**Table 4.2. Results of Unit Root Tests**

Variable	ADF Test (Trend and Intercept)		PP Test (Trend and Intercept)	
	At level	At first difference	At level	At first difference
Ln (Exports)	-2.172	-5.181***	-2.299	-5.203***
Ln (Imports)	-2.085	-4.399***	-2.452	-4.399***
Ln (GDP)	-1.885	-5.100***	-2.141	-5.095***

Notes: \*\*\* indicates the significance of the unit root test at 1 percent.

Source: authors' estimations from data

The test results depicted in Table 4.2 indicate that both the ADF test and PP test for GDP, imports and exports are statistically insignificant at level, leading to nonrejection of the null hypothesis of the existence of unit roots in the variables. The test results at the first difference are statistically significant at 1 percent and revealed that there is no unit root (stationarity) in the variables and that the null hypothesis is rejected. Hence, all of the variables are integrated in first order, i.e., I (1).

#### *4.3. VAR Optimal Lag selection Criterion*

When all the variables are stationary in the same order, i.e., first order/difference, the next step is to check the cointegration among the variables taken into account. Before cointegration analysis, it is necessary to choose the optimal lag length, which is required for further analysis. The VAR model is used for optimal lag length selection based on different criteria, i.e., LR, FPE, AIC, SC and HQ.

**Table 4.3. Results of VAR Optimal Lag Selection Criterion**

<b>Lag</b>	<b>LogL</b>	<b>LR</b>	<b>FPE</b>	<b>AIC</b>	<b>SC</b>	<b>HQ</b>
<b>0</b>	0.391096	NA	0.000231	0.141022	0.271637	0.187070
<b>1</b>	131.0798	233.1204*	3.22e-07*	-6.436745*	-5.914285*	-6.252554*
<b>2</b>	139.3984	13.48972	3.38e-07	-6.399916	-5.485611	-6.077581
<b>3</b>	142.4970	4.522253	4.78e-07	-6.080920	-4.774771	-5.620441

Notes: \* represents the optimal lag selected by the criterion  
Source: authors' estimations from data

The results of the VAR model for the selection of the optimal lag value are listed in Table 4.3, indicating that all of the given criteria from LR to HQ suggest choosing lag one (1) as the optimal lag length for the cointegration analysis, which was the same result as that in Saaed and Hussain (2015). The next step is to test the model to identify if any cointegration exists.

#### *4.4. Johansen test of cointegration*

As all the variables were stationary in the same order, i.e., at first order, the suggested tests for cointegration are those of Engle and Granger (1987) and Johansen and Juselius (1990). The Johansen test encompasses the maximum

eigenvalue and trace statistics. The results of the Johansen test of cointegration are presented in Table 4.4

**Table 4.4. Results of the Johansen Test of Cointegration**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max. Eigenstatistic	0.05 Critical Value	Prob.**
<b>None</b>	0.259966	16.97684	29.79707	0.6418	11.44	21.132	0.603
<b>At most 1</b>	0.134598	5.536607	15.49471	0.7495	5.493	14.265	0.678
<b>At most 2</b>	0.001138	0.043284	3.841466	0.8352	0.043	3.841	0.835

Source: Authors' estimations from data

The Johansen test results revealed that there is no cointegration between the variables, as the numerical values of the trace statistic and maximum eigenstatistic are less than the critical value at 5%, which suggests that the null hypothesis (no cointegration) is not rejected, and these results were confirmed by Hussain (2014) and Bakari and Mabrouki (2017). Hence, no cointegration among the tested variables was witnessed. As there is no cointegration among the variables, the study proceeded to estimating the vector autoregressive model.

#### 4.5. VAR Estimation

The results of the VAR model are given in Table 4.5, indicating that there is a positive but statistically insignificant impact of exports on economic growth. Similarly, the impact of imports on economic growth is positive but statistically insignificant, and the results are in line with those of Bakari and Mabrouki (2017) and Bakari (2017).

**Table 4.5. Results of the VAR Model**

Variable	LY	LE	LI
LY(-1)	0.855554	0.151246	0.069216
	(0.11392)	(0.16492)	(0.20269)
	[ 7.51041]	[ 0.91706]	[ 0.34149]
LE(-1)	0.087586	0.953121	0.124854
	(0.07847)	(0.11361)	(0.13963)
	[ 1.11612]	[ 8.38918]	[ 0.89419]
LI(-1)	0.041644	-0.140074	0.762562
	(0.09258)	(0.13404)	(0.16473)
	[ 0.44981]	[-1.04504]	[ 4.62920]
C	0.478612	0.166401	0.438697
	(0.29430)	(0.42608)	(0.52364)
	[ 2.62627]	[ 0.39054]	[ 0.83778]

Notes: ( ) represents standard errors, and [ ] represents t-statistics.

$$\text{LnY} = \text{C(1)} * \text{Ln (Y(-1))} + \text{C(2)} * \text{Ln(E(-1))} + \text{C(3)} * \text{Ln(LI(1))} + \text{C(4)}$$

Variable	Coefficient	Standard Error	T-Statistic
C(1)	0.855554	(0.11392)	[ 7.51041]***
C(2)	0.087586	(0.07847)	[ 1.11612]
C(3)	0.041644	(0.09258)	[ 0.44981]
C(4)	0.478612	(0.29430)	[ 2.62627]***

Notes: \*\*\* represents the significance of the variable at 1 percent.

Source: Authors' estimations from data

#### 4.6. Diagnostic tests

To diagnose the problems related to model specification, serial correlation, normality and heteroscedasticity, postestimation diagnostic tests were conducted. The results are depicted in Table 4.6.

**Table 4.6. Postregression Diagnostic Tests**

Postregression Diagnostic Tests		
Test statistic	Estimated value	Probability value
<b>R-squared</b>	0.9925	-----
<b>Adj. R-squared</b>	0.9918	-----
<b>F-statistic</b>	1547.873	0.000
<b>Serial correlation LM tests</b>	3.535	0.940
<b>Normality (JB) test</b>	1.0	0.590
<b>Residual heteroskedasticity test</b>	39.155	0.330

Source: Authors' estimations from data

The postregression diagnostic test displayed in Table 4.6 indicates that 99.22 percent of the variation in economic growth is explained by imports and exports. The serial correlation LM test result is insignificant, leading to the nonrejection of the null hypothesis (no serial correlation) that the model is free from serial correlation problems. The result of the Jarque-Berra test is statistically insignificant at 5%, implying the nonrejection of the null hypothesis (data are normal), indicating that the data are normally distributed. The P-value of the heteroscedasticity test is 0.33, which is greater than 0.05, implying that residuals are free of heteroscedasticity. The results are in line with those of the reviewed literature.

#### 4.7. Pairwise Granger Causality Test Results

To assess the direction of causality, a pairwise Granger causality test was conducted. The results of the Granger causality test are depicted in Table 4.7.

**Table 4.7: Results of the Granger Causality Test**

Null Hypothesis	Observations	F-Statistic	P-Value
LE does not Granger cause LY	38	5.91942	0.0064***
LY does not Granger cause LE		0.37266	0.6918
LI does not Granger cause LY	38	3.11788	0.0575**
LY does not Granger cause LI		2.19897	0.1269
LI does not Granger cause LE	38	0.20741	0.8137
LE does not Granger cause LI		2.22738	0.1238

Notes: \*\*\* represents significance at 1 percent, and \*\* represents significance at 5 percent.

Source: authors' estimations

The test results indicate that there is a unidirectional causality running from exports to economic growth at the 1% level of significance, validating the export-led growth hypothesis, and the results are in conformity with those of the studies of Kónya and Singh (2006), Thirunavukkarasu and Achchuthan (2014), Hatemi (2002), Albiman and Suleiman (2016), Shirazi and Manap (2004), Saaed and Hussain (2015), and Bakari (2017). Similarly, imports Granger cause growth unidirectionally at the 5% level of significance, confirming the import-led growth hypothesis in the case of Pakistan, which is in line with Thirunavukkarasu and Achchuthan (2014), Kónya and Singh (2006) and Bakari (2017). However, there is no evidence of causality from exports to imports and vice versa, which has been validated by Shirazi and Manap (2004) and Hussain (2014).

## **5. Conclusions**

This research study aimed to investigate the nexus among exports, imports and economic growth in Pakistan by incorporating annual data of the variable series from 1976 to 2015. The study employed time-series data analysis encompassing cointegration analysis, a VAR model and the Granger causality approach. The results indicated that all the variables were graphically upward trended and stationary in first order. No cointegration existed among variables, and a positive and insignificant impact of the trade variables on economic growth was seen. The results of the pairwise Granger causality test indicated that there is unidirectional causality running from exports to economic growth because exports compel economic units to allocate resources efficiently, have economies of scale, operate in tangible productive efficiency after acquiring productive technology, improve capital formation, and improve foreign reserves earning through market linkages and networking, which boost the job market and ultimately ends at economic growth. Statistically significant unidirectional causality was witnessed from imports to economic growth because Pakistan imports encompass capital goods, information technology, and additive raw materials, which directly and indirectly increase agricultural, manufacturing and service production, multiply the level of output and thus improve the GDP growth rate. On the basis of the nexus among economic growth, exports, and imports, the study concluded that the export-led and import-led growth hypotheses are validated in Pakistan.

## 6. Recommendations

The policy implications in light of the study findings are as follows: the government should discourage exports of primary goods and focus on diversifying and incentivizing manufacturing sector production and export-oriented industrial structures to obtain diverse exports to attract foreign markets. Small and medium-sized enterprises must be encouraged to take this approach along with ensuring export quality. Export promotion measures should be taken to bring home foreign reserves, boost economic activities and create employment opportunities. THE Government should, if not exempting export taxes, lessen its burden, and exports should be subsidized. Imports should be productive, not consumptive and costly, and unproductive imports should be curtailed. The government should establish diversified trade relations and ensure trade stability and foreign reserve maintenance.

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**CAN THE SERVICE SECTOR ACT AS AN ENGINE OF  
GROWTH FOR THE ECONOMY OF PAKISTAN? AN  
EMPIRICAL INVESTIGATION WITH AN ERROR  
CORRECTION MODEL**

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**Abstract**

The service sector is an indispensable part of the progress of all the sectors of an economy. Technological improvements in terms of human capital have induced growth in the service sector, which has triggered new, marvelous growth in many developing economies. This study examines the role of the service sector in the growth of Pakistan from 1980-2018 by applying a Johansen cointegration and vector error correction model. The findings of this study show that the service sector has positive and momentous effects on Pakistan's economy; in this way, this sector acts as an engine for the growth within the country's economy. Moreover, the outcome of the Johansen cointegration test indicates that successive cointegration exists between the examined regressor variables, which include the service sector and the growth of the Pakistani economy. Considering the results of this study, it is concluded that the service sector plays an important role in progress and development, especially in developing countries. To increase the effectiveness of this sector, the government needs to equip individuals with technical and educational skills.

**JEL CLASSIFICATION:** E20, E22, F1, J21, O14,

**KEYWORDS:** SERVICE SECTOR, ECONOMIC GROWTH OF PAKISTAN, ERROR CORRECTION MODEL

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## **1. Introduction**

Currently, the service sector leads as the most rapidly increasing sector in the world's economy, contributing a major share of the overall output and employment in most developed countries. The service sector contributes seventy percent of the total GDP in high-income economies, fifty-three percent of that in middle-income economies and forty-seven percent of that in low-income economies. The service sector supports each and every sector of an economy, providing them with infrastructure, fast communication and the ability to become connected and prosper. The service sector contributes a great deal towards the stability and growth of the economy of Pakistan. The service sector is the main employment-generating sector in Pakistan; in contrast, the manufacturing sector lacks employment creation opportunities.

Currently, the service sector is considered an important driver behind the development and growth of economies. The service sector has received much attention, especially in developing countries, as it contributes significantly more to the growth of developed, emerging and developing countries than other economic sectors (Zeb and Hussain, 2017). The service sector contributes approximately seventy-three percent of the economic growth of developing countries, fifty-three percent of that of emerging and middle-income countries, and forty-seven percent of that of low-income and developing countries (Ahmed and Ahsan, 2011). The service sector also significantly contributes to the productive efficiency, output and employment of the agriculture and manufacturing sectors; thus, the role of the service sector is considered heterogeneous, as it transforms from being capital intensive to being labor intensive.

The service sector plays an important role in improving the growth, development and maintenance of the living standards of human beings by providing employment opportunities, reducing poverty and increasing income-generating activities; thus, it plays an influential role in the economic activities of Pakistan. Due to the improvements in the service sector that have been achieved through advancements in human resources related to the enhancement of technical skills, the growth of the Pakistani economy has become heavily dependent on the service sector, despite the fact that this sector possesses scarce resources and has an underdeveloped, small industrial base. Over time, especially after 2000, the growth of the service sector, as well as its contribution to the economy of Pakistan, rapidly increased. During 2016-17, the service sector contributed approximately sixty percent of the total GDP

of Pakistan, contributing more than the agriculture and manufacturing sectors to the growth and development of the Pakistani economy (Economic Survey of Pakistan, 2016-17). Moreover, the service sector also plays a fundamental role in contributing to the economic activities of the agriculture and industrial sectors.

The role and importance of the service sector increases daily. The service sector contributes approximately seventy-one percent of global GDP (World Bank, 2016). Realizing the importance, rapid growth and contribution of the service sector to overall GDP, to reduce poverty, increase income-generating activities and provide more employment opportunities, the World Bank has taken an increased interest in expanding the role of the service sector, especially in developing countries. The service sector significantly contributes to various economic activities in countries that lead to improvements in the performance of public sector entities, consumer service organizations, business activities, the banking sector, trade, government revenue, etc., and these improvements demonstrate the effective role of the service sector in the growth of the economy (Soni, 2013). The contribution of the service sector has remained dominant in some important economic sectors, such as education, health, transport and communication, production, marketing, and research and development. Moreover, the rapid growth and development of the service sector as well as the increase in its contribution to world economies is mainly due to the globalization and advancement of the services industry (Singh, 2014)

Currently, the service sector is the backbone of the social and economic growth of developed, emerging and developing economies. Globally, the service sector is the fastest-growing sector that contributes to most economies, and it leads in terms of providing employment opportunities. During recent years, the technological service sector has increased in importance and enabled new means of service delivery across borders. The contribution of the service sector has also increased Pakistan's growth and trade during the last two to three decades, and it has become the most influential sector in the growth of Pakistan. In addition, it plays an important role in reducing poverty, as employing more individuals reduces the overall level of unemployment in the country. However, there are very few studies on the role of the service sector in Pakistan's economic growth. Therefore, this study represents an empirical attempt to evaluate whether the service sector acted as an engine of growth in the economy of Pakistan from 1980-2018.

### *1.1. Overview of the Contribution of the Service sector to the Pakistani Economy*

The service sector is the main contributor to the economic activity of Pakistan. The structure of the country's economy has been significantly modified over the past decades. Regarding the goods sector of Pakistan, the contribution of agriculture has gradually decreased to 21.5 percent of GDP in 2005-06 from 43.6 percent in 1960-61, while the share contributed by industry increased to 25.2 percent of GDP in 2009-10 from 15.6 percent in 1960-61. In 2014-15, the share of GDP contributed by the service sector was 58.8 percent, while in 2013-14, this share was fifty-six (56) percent (Source: Economic Survey of Pakistan; various issues).

The contribution of the service sector has rapidly increased during recent decades. The subservice sectors that have significantly contributed to this increase are the transport and communication, ownership of dwellings (housing services), finance and insurance, wholesale and retail services, defense and public administration, general government services and other social service sectors. All the sale and retail trade services have played an important role in the growth of the service sector as well as in the economic growth of Pakistan; the contribution of these services to GDP was 18.3 percent, while they represented thirty-one percent of the service sector during 2014-15 (Source: Economic Survey of Pakistan, 2015-16). The transport and communication subsector has successfully contributed to the growth of Pakistan, as well as its service sector, and has proven to be one of the most important subsectors of services. The transport and communication subsector represents 13.4 percent of the service sector and contributes 22.7 percent of the country's total GDP. The general government services subsector has played a considerable role in the service sector, and it contributes 7.4 percent of the sector's GDP; additionally, it represents 12.7 percent of the GDP of Pakistan. The ownership of dwellings (housing services) subsector represented approximately 11.5 percent of the service sector and 6.8 percent of total GDP during 2014-15. The contribution of the social services subsector to the GDP of Pakistan is currently 9.9 percent, and it represents 16.8 percent of the overall service sector; thus, it remains a major subsector of the service sector (Source: Economic Survey of Pakistan, 2014-15).

During 2009-10, the contribution of the service sector to GDP increased to 53.3 percent from 39 percent in 1960-61; consequently, the service sector became the largest contributor to the GDP of Pakistan. Cross-country data

show that the structural transformation of Pakistan's economy went through several phases. During the initial phase of this transformation, the decrease in the share of GDP contributed by the agriculture sector was covered by an increase of approximately the same size from the industrial sector, while the contribution of the service sector remained more or less sluggish. During the next phase of economic development, an exchange between the industry and service sector occurred, whereas the agriculture sector remained stable; this implies that the service sector increased the GDP of the agriculture sector. In Pakistan, there has been a phase of change, as the country has gone from emphasizing the agriculture sector to emphasizing the service sector (Ahmed and Ahsan, 2012).

The service sector developed very quickly between 1975-76 and 2003-12; indeed, the average growth rate of this sector was 5.46 percent, whereas the growth rate of the commodities sector was 4.96 percent. However, the growth rate of the industrial sector was 5.7 percent, which was higher than that of the service sector. This increase in the service sector growth rate occurred due to an increase in the growth of the finance and insurance sector. From 1975 to 2012, the growth rate of the finance and insurance sector was 6.8% because of the implementation of the accommodative policies of the State Bank of Pakistan. From 1975 to 2012, the growth rate of the social and community sector increased to 6.5 percent. Sectors such as the wholesale and retail trade, transport, storage and communication, ownership of residence, public administration and defense sectors achieved moderate increases in their growth rates (Asian Development Bank, 2012).

### *1.2 Objective of the Study*

As the performance, growth and contribution of the service sector is gradually increasing across the world, this sector is significantly contributing to the growth of developed, developing and developing countries. The contribution of the service sector towards the GDP of Pakistan has also increased, even though this sector contributes more to the economy of Pakistan than the primary and secondary sectors of the economy do. Therefore, this study empirically examines the performance of the service sector in terms of the growth of the Pakistani economy, exploring whether the service sector truly acts as engine of growth for economy of Pakistan.



## **2. Literature Review**

The service sector has received much attention, especially over the last two decades, as the contribution of this sector, especially in developing countries, has increased over time. Cinyabuhuma and Ndoye (2017) found that the service sector accounted for approximately 66% of the growth of the Senegalese economy from 2006 to 2013, which was much more than that accounted for by the agriculture and manufacturing sectors. Furthermore, the study concluded that the share of private services in the telecommunication sector remained high (48%) compared to that of other sector services. Agostino et al. (2006) investigated the role of the service sector in the employment level using panel data from European Union nations and found that the service sector played an influential role from 1970 to 2003 in the studied nations. The service sector played a major role in the growth of the Pakistani economy, especially via the telecommunication sector and information technology community services, from 1990 to 2005 (Ajmair, 2011).

Khan (2017) examined the contribution of the service sector and its effect on private investment and government expenditure for <sup>2</sup>four selected Asian countries during 1995-2014. The findings from the panel analysis of this study showed a significant and positive role of the service sector in private sector investment. However, the study found that the service sector had a negative effect on the health and agriculture sector, while the education sector remained unaffected. Park (2013) found that an increase in the size of the service sector not only contributed to the GDP of Asian countries but also was very effective for reducing poverty and providing employment opportunities. Mujahid and Alam (2014) investigated the different factors influencing the service sector by applying cointegration and vector autoregressive methodology. Their study found that public sector consumption, foreign direct investment and population growth are influencing factors of the service sector. Mukherjee (2013) concluded that the contribution of the service sector to the growth of India is increasing quickly; however, due to the high population growth rate, this sector still does not play an effective role in achieving an optimal level of employment, although it is the largest sector.

The driver behind the growth of the service sector during the previous decades has been the growing communication and information technology

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<sup>2</sup> Pakistan, China, India & Bangladesh.

sector (Busari, 2007). It has been stated that in developing countries, the share of service sectors such as those of software programming, business and finance has increased, leading to a decline in the role of manufacturing industries over time (Szirmai and Verspagen, 2010). The transformation of the economy from agriculture to industrialization and the subsequent structural modification from manufacturing to services can be observed as an economic development process (Clark, 1941; Kuznets, 1957; and Fuchs, 1980). Kongsamut et al. (2001) found that the service sector significantly contributed to increasing GDP per capita for a sample of 123 economies between 1970 and 1980. During approximately the same time frame, Pakistan's service sector grew, and fifty-four percent of the country's GDP growth came from the service sector, accounting for almost one-third of the total population in terms of per capita GDP. In addition, the service sector facilitated the agriculture and manufacturing sectors of the economy and boosted their productive capacity, as there has been a strong relationship between these sectors.

The empirical research on the performance and growth of economic sectors is greatly enhanced by (Lewis, 1954; and Hirschmann, 1958) the dual economy model, which explains the relationship between the conventional agriculture sector and the advanced manufacturing sector. Glasmeier and Marie (1993) argued that there are two conflicting views regarding the service sector's impact on economic growth; that is, the service sector either assists economic growth or it neither depends on nor is a substitute for traditional sectors and manufacturing sectors such as mining, agriculture and manufacturing industries. However, since 1950, the empirical results of many studies have indicated that the leading sector in developed countries is the service sector (Warton, 1974). The Economic Council of Canada (1991) found that the dominant service sector contributes two-thirds of the employment and production opportunities in developed countries, and the correlation between the service sector and economic growth relies on the size of the sector and its economic productivity.

(Mansell, 1985) suggested that an export-oriented service sector slows the growth of trading partners more than the goods-producing sector does. The service sector plays an important role in strategic policy development because of its major and indispensable function in the economy; economic growth is directly linked with the service sector, which is connected indirectly with human capital. Hoekman and Eschenbach (2005) derived a positive connection between economic growth and the growth of the service sector.

Arnold et al. (2008) proposed that the telecommunications, finance, and transport sectors are the core determinants of the service sector, which enables business and open competition in the international market. Arnold et al. (2010) found that India's progress towards improved transportation, banking, insurance and telecommunications has prompted the establishment of administrative policies for the service sector that have led to improved productivity in manufacturing and additional enhanced economic efficiency; thus, the service sector has both directly and indirectly impacted economic growth in a positive and significant way. Miroudot et al. (2010) observed an increase in productivity that was connected to services that were exposed to international competition.

### **3. Results, Methodology & Discussion**

Over time, the share of the service sector is increasing in all areas of Pakistan's economy, as the average annual growth rate of this sector is higher than the growth rates of the agriculture and industrial sectors. The service sector contributes approximately fifty-four percent of the country's GDP and slightly more than one-third of its overall employment. The service sector plays an essential role in the development of other sectors of the economy by providing necessary inputs to the agricultural sector and manufacturing sector. The service sector has greatly contributed to Pakistan's economic growth, and its share of GDP is at least fifty percent, enhancing the country's overall economic growth and development and particularly supporting trade and employment generation.

To empirically analyze the role of the service sector in the economic growth of Pakistan from 1980 to 2018, Pakistan's economic growth (GDP) is taken as the dependent variable of this study's analysis, and the service sector (SER), openness (OP), population growth (POP), the labor participation rate (Lb) and foreign remittances (FR) are taken as independent variables. To empirically examine the impact of the explanatory variables on the dependent variable, the following vector error correction model is applied (VECM).

$$GDP_t = \alpha_0 + \alpha_1 SER_{t-1} + \alpha_2 OP_{t-1} + \alpha_3 POP_{t-1} + \alpha_4 Lb_{t-1} + \alpha_5 FR_{t-1} + \mu_t \dots \dots \dots (3.1)$$

The sign of the coefficient is expected to be

$$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 > 0, \alpha_5 > 0,$$

Time series data may be affected by unit roots, which produce spurious results. To avoid this problem and to determine the level of stationarity of the data, the data used in this study are tested for unit roots by running an

augmented Dicky-Fuller unit root, and the results of this test are given in Table 1.

**Table 1. Unit Root Test Results**

Variables	Acronyms	ADF Test Outcomes		PP Test Outcomes	
		I(0)	I(1)	I(0)	I(1)
Economic Growth	<b>GDP</b>	-2.038261	-3.657351*	-1.127221	-4.693103*
Service Sector	<b>SER</b>	-1.836471	-3.873014*	-2.185117	-5.174335*
Openness	<b>OP</b>	-1.746281	-4.548136*	-1.972832	-6.202161*
Population Growth	<b>POP</b>	-2.093719	-4.038714*	-1.355745	-4.649810*
Labor Force Participation	<b>Lb</b>	-0.948271	-3.739206*	-1.291628	-4.610453*
Foreign Remittances	<b>FR</b>	-1.271824	-4.730765*	-1.641507	-4.897413*

(\*) indicates the rejection of the null hypothesis of the unit root at 5%

The ADF test is applied to all the variables at level  $\{I(0)\}$ , and the results, which are shown in table (1), indicate the acceptance of the <sup>3</sup>null hypothesis at this level. Therefore, the ADF test is applied at the first difference  $\{I(1)\}$ ; all the variables show their stationarity and the rejection of the null hypothesis is supported. To further confirm and investigate the data's level of stationarity, a Phillips-Perron (PP) test is applied, and the outcomes of the test, which are shown in table (1), are consistent with the findings regarding stationarity (all the variables are stationary at the 1<sup>st</sup> difference) of the ADF test.

Before analyzing the variables through regression analysis, the data are tested for cointegrating factors to enable the application of an appropriate regression model for further analysis. To examine the cointegration among the study variables, a Johansen cointegration test is applied with trace statistics and the maximum eigenvalues, and the results of both tests are shown in Table (2). Furthermore, these results show some level of cointegration and provide direction for the ECM regarding further regression analysis of the variables.

<sup>3</sup> There is a unit root in the data.

**Table 2. Johansen Cointegration Test Results**

Hypotheses		Trace Stat. Values	Critical Values	Hypotheses		Eigenstate Values	Critical Values
H <sub>0</sub>	H <sub>1</sub>			H <sub>0</sub>	H <sub>1</sub>		
r=0	r≥1	189.0707*	95.75366	r=0	r≥1	78.50239*	40.07757
r≤1	r≥2	110.5683*	69.81889	r≤1	r≥2	48.80579*	33.87687
r≤2	r≥3	61.76251*	47.85613	r≤2	r≥3	33.44163*	27.58434
r≤3	r≥4	28.32088	29.79707	r≤3	r≥4	15.89062	21.13162
r≤4	r≥5	12.43025	15.49471	r≤4	r≥5	12.39210	14.26460
r≤5	r≥6	0.038149	3.841466	r≤5	r≥6	0.038149	3.841466

The vector error correction model is applied to empirically examine the impact of the service sector on the economic growth of Pakistan from 1980-2018. The results regarding the normalized coefficient used to investigate the impact of the explanatory variables on the dependent variables and obtained from the regression analysis of these variables are given in table (3).

**Table 3. Normalized Coefficient Results**

Variables	D(GDP)	D(SER)	D(OP)	D(POP)	D(Lb)	D(FR)
Coefficient	1.000000	0.432546	0.114594	0.232189	0.345163	0.336325
Std. error	---	(0.192005)	(0.05083)	(0.12852)	(0.11675)	(0.16707)
t-stat.	---	[2.25278]	[2.25434]	[1.80663]	[2.95646]	[2.01308]

The importance and contribution of the service sector to economic growth is quickly increasing globally as well as in Pakistan. The empirical results of this study that were obtained from the regression analysis of the variable data, which are given in table (3), show that the service sector has an affirmative and notable effect on the economic growth of Pakistan; additionally, the coefficient value of the service sector indicates that a one percent increase in this sector brings an increase of approximately forty-three percent to the economic growth of Pakistan.

Furthermore, the contribution of the service sector to Pakistan's economic growth increased considerably during this decade. The contribution of services to exports increased to twenty-one percent from eighteen percent between 2008-09 and 2009-10. During the same period, the contribution of services to imports decreased to eighteen percent from 19.08 percent, which assisted in improving the trade balance in 2009-10. Pakistan experienced a surplus in exports of computer and information services, communication, and government services. In 2009-10, government services represented

approximately 10.2 percent of total exports, while transportation represented approximately 4.64 percent. However, the contribution of transportation services to exports decreased between 2008 and 2010 due to a decrease in way and freight earnings and the reduced local operations of foreign transport companies during this time.

Urbanization and issues involving living standards impact the employment ratio between the agriculture sector and the other sectors of the economy. Various jobs differ in terms of nature and pattern, and the service sector provides unskilled, semiskilled, skilled and highly skilled laborers to fill them, including doctors, engineers, salespeople, builders, financial consultants and hairdressers.

Between 1973 and 2009, the ratio of workers in the service sector to total employment increased from twenty-seven percent to thirty-five percent. This was mostly due to jobs in public administration and defense, essential social security, education, health and social work. Transportation, storage and communication also played a significant role in job creation during this time. In 2009, 2.76 million citizens were working in this sector. The financial sector, which includes insurance, real estate and business services, still represented a small portion of employment generation. In 2008-09, it employed approximately 820,000 people.

The importance of the service sector can be recognized by the extent of its impact on the other sectors of the economy. In Pakistan, the economy's transformation from an emphasis on the primary (agriculture) sector to an emphasis on the tertiary (services) sector excluded the secondary (manufacturing) sector; therefore, the country's shortcomings in terms of exports or trade deficits have been greatly mitigated by the service sector.

Moreover, the results shown in Table (3) demonstrate that openness, population growth, the labor participation rate and foreign remittances also had positive and momentous effects on the economic growth of Pakistan between 1980 and 2018.

**Table 4. Error Correction Model (ECM) Results**

ECM	D(SER)	D(OP)	D(POP)	D(Lb)	D(FR)
CointEq1	-0.745415	-0.347298	-0.053294	-0.318034	-0.426680
Std. error	(0.20611)	(0.17206)	(0.03730)	(0.07301)	(0.22297)
t-stat.	[-3.61667]	[-2.01847]	[-1.42874]	[-4.35587]	[-1.91364]
R-squared	0.835774	0.828790	0.731776	0.542352	0.659694
Adj. R-squared	0.753662	0.746-356	0.597665	0.413528	0.489541

The above results in Table (4) show that there is a long-term relation between the growth of the service sector, openness, the labor participation rate, foreign remittances and the economic growth of Pakistan. Furthermore, the results of the cointegration equation (ECT) also show different levels of convergence towards equilibrium. However, the ECT coefficient value corresponding to population growth is insignificant, which shows that population growth does not play an important role in the convergence of the growth model towards equilibrium.

#### **4. Conclusion**

The growth rate of the Pakistani economy has been very volatile since the country's independence, which created economic instability that resulted in the privation of the steady growth of most of the economic activities in the country. However, during the last two decades, while the growth rate of the manufacturing and agriculture sectors has not been satisfactory, the service sector has efficiently contributed as much as sixty percent of the growth of the Pakistani economy.

The current study examines the role of the service sector in the growth of the Pakistani economy to empirically investigate whether the service sector can act as an engine of growth for the economy of Pakistan. A Johansen cointegration test is applied to determine the order of integration and long-run associations between the service sector and the growth of the Pakistani economy. The outcomes of the cointegration test indicate that the service sector is cointegrated with the growth of the Pakistani economy, and this cointegration leads to a long-run association between the service sector and the GDP of Pakistan. Furthermore, the findings of the vector error correction model show the effective role of the service sector in the growth of the Pakistani economy, thus proving that it acts as an "engine of growth" for the Pakistani economy.

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**THE ROLE OF MACROECONOMIC AND INSTITUTIONAL  
FACTORS IN FOREIGN DIRECT INVESTMENT AND  
ECONOMIC GROWTH: EMPIRICAL EVIDENCE IN THE  
CONTEXT OF EMERGING ECONOMIES**

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**Abstract**

The present study investigates the role of institutional and governance factors in foreign direct investment and economic growth in BRICS (Brazil, Russia, India, China and South Africa) and MINT (Mexico, Indonesia, Nigeria and Turkey) countries. An essential contribution of the paper is to empirically examine the intercorrelation of foreign direct investment and economic growth in light of macroeconomic and institutional factors.

To empirically examine the proposed narrative, the paper uses annual data on the 9 BRICS and MINT countries covering the period of 1990 to 2017.

In our full specification, we employ the system generalized method of moments and seemingly unrelated regression techniques, as both methods can provide robust and consistent findings. The empirical results reveal that along with the macroeconomic environment, institutional and governance-related factors affect FDI and economic growth with a large magnitude.

The reported findings are positive for BRICS countries, highlighting that FDI, trade, government size, and legal system robustness positively influence growth. On the other hand, our findings for MINT countries reveal that the institutional environment and economic conditions adversely affect economic growth and foreign direct investment. Overall, the paper draws novel conclusions and discusses relevant implications for helping emerging economies achieve their strategic economic goals.

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**JEL CLASSIFICATION:** C23; F14; F21.

**KEYWORDS:** FDI; ECONOMIC GROWTH; BRICS; MINT;  
INSTITUTIONAL ENVIRONMENT; SYSTEM GMM.

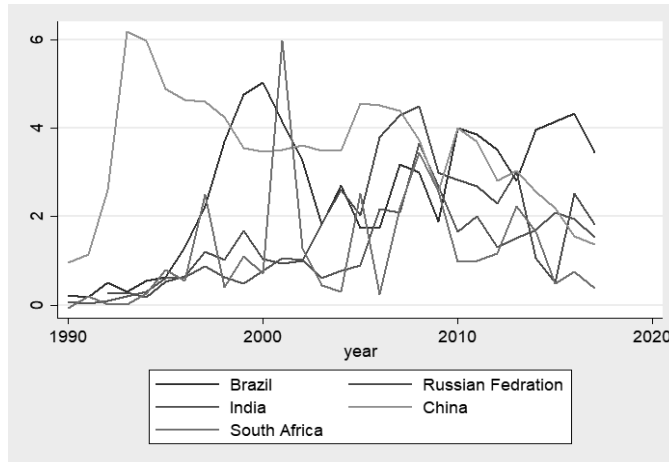
## **1. Introduction**

Investments and trade facilitate the socioeconomic transformation from traditional resource exportation to industrial output production. Efforts to protect domestic industries from the domineering influence of foreign firms and to retain exchange reserves through the introduction of trade restrictions and capital controls (Asongu et al., 2018; Shahzad and Qin, 2019) have been accompanied by a failure to attract capital inflows (De Mello Jr, 1997), which has adverse impacts on economic growth (Rodrik, 1998). Latin American countries reversed such policies, removing restrictions on capital movements, which contributed to economic growth (UNESCAP; 2000) by overcoming financing shortages through attracting FDI. Such changes have the potential to be beneficial for host countries and multinational corporations (MNCs) alike. FDI helps supply funds for investment in host countries and generates spillover effects, such as managerial expertise, governance skills and technology transfers. This not only ensures economic progress but also leads the host country down the path toward sustainable economic development.

According to Blomström and Sjöholm (1999), competition, labor mobility, firm interactions, and the policy environment are critical to technological spillovers. In the process of economic development, globalization and technology transfers are the most prominent effects of trade openness, driving countries' economic transition. Innovation and technology facilitate entry into new markets to challenge existing market competitors. To compete in the international market, local exporters act as subcontractors to foreign companies by using this innovation and technology. Trade spurs the accumulation of capital (physical and human), which enhances output at a given level of capital and technology (Frankel & Romer, 1999; Kalai & Zghidi, 2017). According to the 2017 World Investment Report published by UNCTAD, investment in developing countries in the previous year stood at 14% (US\$ 1.4 trillion), the lowest level since 2010 (US\$ 2 trillion). However, the share of FDI inflows to developing countries in 2012 was 52% of the global total, with BRICS countries among the top recipients (UNCTAD, 2017). In turn, among the MINT countries, Nigeria is reported to be the top country for FDI inflows in Africa, Mexico the top country in Central America, Indonesia the top country in Southeast Asia and Turkey the top country in West Asia (World Bank, 2013). Notably, BRICS and MINT countries have fast-growing economies; this article examines the macroeconomic and institutional factors that impact the foreign investment and economic growth

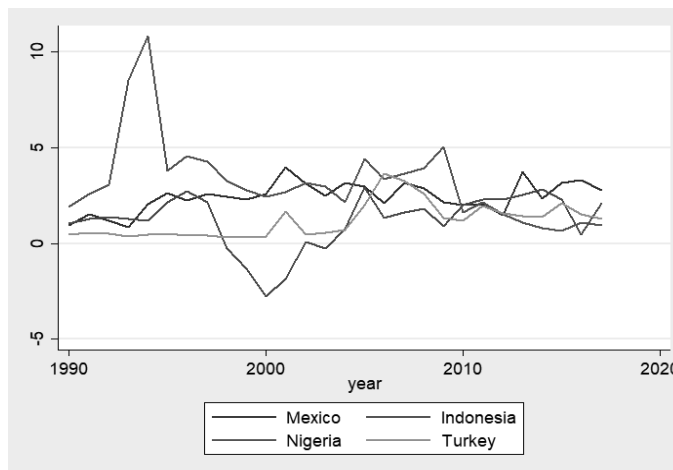
of these economies. Figs. 1(a) and 1(b) show the FDI/GDP inflows for BRICS and MINT countries.

**Fig. 1(a). FDI evolution for BRICS countries**



Source: World Development Indicators (2019)

**Fig. 1(b). FDI evolution for MINT countries**



Source: World Development Indicators (2019)

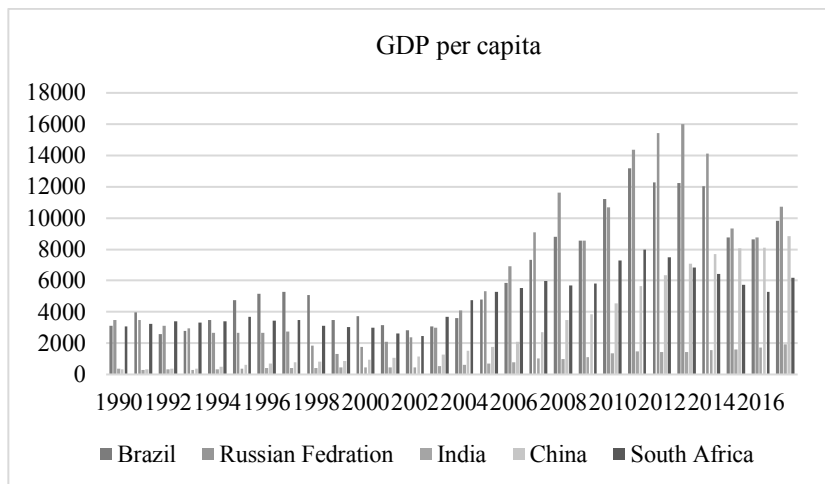
The BRICS, an association including Brazil, the Russian Federation, India, China, and South Africa, all have fast-growing middle classes and influence the economic situation in their respective regions. In 2016, the BRICS accounted for 22% of global gross domestic product and 11% of global FDI inflows, which reached US\$ 277 billion (UNCTAD, 2017). The MINT countries consist of Mexico, Indonesia, Nigeria, and Turkey. Among these countries, only Nigeria is not a G-20 nation. However, Nigeria has massive endowments of natural resources, especially oil and gas. The MINT nations share a few common features: cheap labor, auspicious geo-economic locations, and abundant natural resources. In recent years, the BRICS and MINT countries have established substantive policies to promote trade and FDI inflows (especially to sectors that have employment and output multiplier effects and promote technology transfer and local innovation).

One of the significant benefits of FDI is that it boosts economic growth and reshapes the economy. BRICS and MINT countries have been very focused on introducing long-term sustainable growth. According to the United Nations Conference on Trade and Development (UNCTAD, 2013), the BRICS and MINT economies represent up to 20% of global GDP, 51% of the world population, and 30% of global FDI (Asongu, 2015). Figs. 2(a) and 2(b) present the GDP per capita, revealing that economic growth in these countries is steadily improving. However, previous studies have identified different determinants of economic growth for developing and emerging nations. This paper mainly focuses on FDI, trade, lagged economic growth, and institutional variables (government size, legal system strength, and access to sound money) as the main explanatory factors. To the best of our knowledge, this is the first study to investigate the FDI-economic growth nexus for BRICS and MINT countries by incorporating institutional factors as critical determinants of market-based growth and FDI. With the massive role of BRICS and MINT countries in reshaping the global economy, there is a need to examine the determinants of economic growth and foreign investment in these countries. The present study aims to examine whether economic growth improves through trade and integration policies and whether these trigger FDI inflows for BRICS and MINT economies.

The paper contributes to the literature regarding how FDI and institutional quality impact economic growth and vice versa. To our knowledge, the present study is the first to empirically investigate the role of institutional factors using data from the Economic Freedom of the World index and the World Bank. Our study is motivated by geopolitical changes and the role of

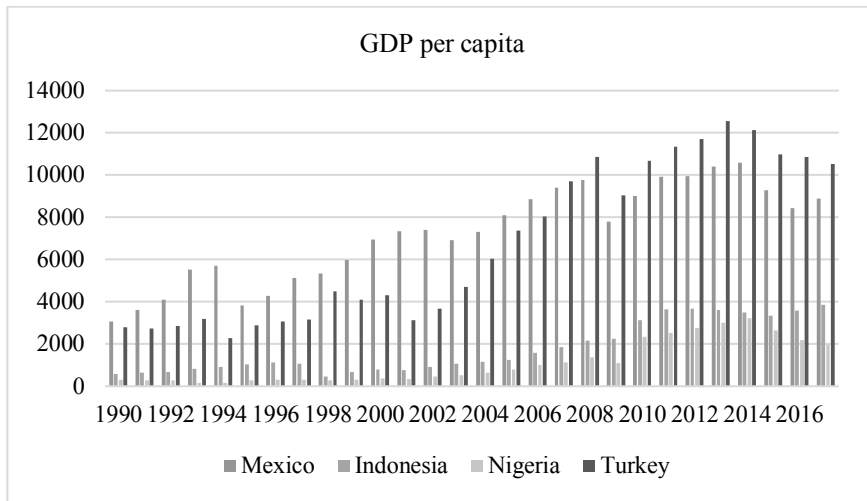
political, social, and economic institutions (Pajunen, 2008). This article is based on an analysis of the integration of institutions and their impact on economic growth and foreign investment, which will help policymakers identify the institutional components of economic progress (Uddin, et al., 2019). The second contribution of the paper is to empirically examine the intercorrelation of FDI and economic growth in light of macroeconomic and institutional factors by employing the seemingly unrelated regression (SUR) method. Meanwhile, we extend the scope of previous studies, which often focus on BRICS countries only (Jadhav, 2012; Vijayakumar et al., 2010). In addition, several previous studies have focused on the FDI-growth nexus and investigated the impact of macroeconomic factors and determinants of FDI (Asongu et al., 2018; Asongu & Odhiambo, 2018; Darley, 2012; Tuomi, 2011). The paper is timely due to institutional quality improvements and geopolitical changes around the world. Hence, the study paper aims to provide pertinent implications of the relationship of the institutional setting with economic growth and FDI.

**Fig. 2(a). GDP evolution for BRICS countries**



Source: World Development Indicators (2019)

**Fig. 2(b). GDP evolution for MINT countries**



## 2. Background Literature

Previously, a very limited literature has discussed the role of institutional and governance factors in the economy. Specifically, studies on developing and emerging economies have provided inconclusive evidence on the FDI-growth nexus (Asongu et al., 2018; Bashir et al., 2015; Vijayakumar et al., 2010). The first part of this paper discusses foreign direct investment and economic growth, motivated by recent trends and capital inflows in these countries (Asongu & Odhiambo, 2018). As the literature has mainly focused on macroeconomic indicators as determinants of FDI and growth, this paper further incorporates governance and institutional factors to examine their impact on FDI and economic growth (Uddin et al., 2019). We are motivated by institutional theory, which has particular relevance to the study of emerging economies. However, so far, there is a paucity of research literature linking institutional factors with FDI and economic growth in emerging markets (Bailey, 2018). Within this framework, we examine how institutional factors affect investors. Finally, we examine the effects of trade openness and labor in promoting economic growth (Kalai & Zghidi, 2017). Competing explanations of the effects of FDI, trade, and labor on growth are offered by



neoclassical theory and dependency theory (Gammoudi et al., 2016). Dependency theory is based on a Marxist foundation and posits that globalization relies on cheap labor, market capitalism, and the exchange of primary resources in return for obsolete technological know-how from developed countries. In contrast, neoclassical theory states that an exogenous rise in FDI temporarily increases capital and per capita income and does not affect economic growth in the long run. To evaluate these arguments, we select emerging economies to see how they differ from developing economies.

There is a vast empirical literature explaining the role of FDI and trade in the economic growth of host countries. The previous literature has findings that vary by economic region and the econometric models used. According to Karbasi et al. (2005), the majority of the studies have focused on the impact on economic growth of either trade or FDI only. In recent literature, Basu et al. (2003) and Balamoune-Lutz (2004) investigated the relationship between FDI and economic growth. At the same time, Uddin et al. (2019) and Alam et al. (2019) explored institutional forces. Similarly, the studies of Kaufmann et al. (2009) and Pahlavani et al. (2005) explained export-led growth.

FDI and financial market development policies can reduce production inefficiencies to boost economic growth by attracting FDI. At the same time, the impact of the financial structure on the economic structure cannot be leveraged without an efficient financial sector (Azman-Saini et al., 2010). The relationship between FDI and economic growth may not be significant, but FDI may lead to a rise in private consumption. This sets the stage for import-based growth, which may lead to higher national debt. The combination of FDI and trade can thus produce negative effects on economic growth (De Mello, 1999). Shahzad et al. (2019) reported that foreign remittances and capital accumulation contribute positively but that FDI is a nonsignificant factor in economic growth.

Alam et al. (2019) examined the institutional determinants of research and development (R&D) investments by using data for 664 firms from 20 emerging markets. The findings highlighted that government effectiveness and the rule of law contribute positively to investment inflows but that corruption and political instability discourage R&D investments. Similarly, Uddin et al. (2019) argued that the size of government, legal structure, trade freedom, and civil liberty have a positive effect on FDI inflows in Pakistan. Makiela and Ouattara (2018) investigated the relationship between FDI and economic growth by analyzing a sample of 108 developed and developing countries for the 1970-2007 period, showing that FDI has a positive and

statistically significant effect on economic growth. Alvarado et al. (2017) examined the effect of FDI on economic growth in 19 Latin American countries, and the results revealed that the effect is not statistically significant at the aggregate level. The results varied when the authors evaluated the level of development achieved by countries in different regions. FDI has a significant and positive effect on GDP in high-income countries. However, the effect of FDI in upper-middle-income countries is uneven and nonsignificant. Additionally, the effect of FDI in lower-income countries is statistically significant and negative. Iamsiraroj (2016) examined the association between FDI and economic growth by employing data for 124 countries from 1971 to 2010, confirming that the FDI is positively associated with economic growth overall. Trade openness, economic freedom, and labor force quality are other key determinates of FDI, which in turn stimulates economic growth.

The aforementioned studies suggested that trade promotion and FDI codetermine economic growth. However, these studies were not able to provide a concrete answer on the direction of causality in the relationship. In addition, there is a significant gap in the literature concerning the effect of institutional quality (government size, legal system strength, etc.) on FDI and economic growth. Against this backdrop, the paper aims to make an academic contribution by investigating institutional factors and deriving novel conclusions and implications. The remainder of the paper is structured as follows: section three discusses the data and methodology, section four explains the empirical results and presents the discussion, and the last section offers concluding remarks and policy implications.

### **3. Data, Modeling and Estimation Strategy**

#### *3.1 Data Specification*

This study adopts a panel analysis method to examine the FDI-growth nexus. For this purpose, we include data on macroeconomic indicators, namely, FDI, economic growth, trade openness, capital formation and employment, from the World Development Indicators (2019) for 1990–2017. The sample is restricted to MINT and BRICS countries because they are known as emerging economies with market growth potential (Asongu & Odhiambo, 2018). The BRICS economies include Brazil, Russia, India, China, and South Africa, while the MINT countries consist of Mexico, India, Nigeria, and Turkey. In addition, the data on government size, access to sound money,

and strength of the legal system are obtained from the Economic Freedom of the World index (2019) published by the Fraser Institute and Cato Institute. Table 1 shows the descriptive statistics for all variables. The net FDI inflow to GDP ratio is used as the dependent variable (Asongu, 2015; Jadhav, 2012). According to United Nations reports, the predictors of FDI may relate to resources, efficiency, and sound economic and political policies (UNCTAD 2002). Moreover, the paper incorporates institutional factors as explanatory variables (Alam et al., 2019; Uddin et al., 2019; Shahzad et al., 2019) because they influence investment risk in the focal economies, ultimately impacting the attractiveness of each country for FDI. The motivation behind investigating the effect of institutional factors and macroeconomic variables is to examine whether foreign investment and economic growth are sensitive to governance and institutional quality. In addition, Table 2 presents the definition, description, and data sources of the studied variables.

**Table 1. Descriptive Statistics**

<b>Variables</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
GDP	252	7.867	1.119	5.035	9.681
FDI	250	2.038	1.592	-2.757	10.833
Trade Openness	251	0.463	0.156	0.152	1.106
Capital Formation	252	23.134	8.070	5.459	45.515
Employment	252	53.210	25.993	11.788	99.032
Size of Govt.	252	6.436	1.197	1.240	8.460
Access to Sound Money	252	4.770	1.093	1.300	6.760
Legal System	252	6.588	2.156	0.000	10.000

**Table 2. Variables Description and Data Sources**

Variables	Elaboration	Data Source	Status
<i>GDP</i>	GDP per capita	WDI	<u>Dependent Variable</u>
<i>FDI</i>	Foreign direct investment (current US\$)	WDI	<u>Dependent Variable</u>
<i>TO</i>	Exports plus imports normalized by GDP	WDI	
<i>GFC</i>	Gross fixed capital formation (current US\$)	WDI	
<i>Employment</i>	Percentage of salaried and wage workers	WDI	<u>Independent Variables</u>
<i>GS</i>	Size of government: government consumption spending, transfers and subsidies as % of GDP, top marginal tax rate	EFW	
<i>SM</i>	Access to sound money: money growth, most recent year's inflation, financial market development	EFW	
<i>LS</i>	Legal system: legal structure and security of property rights	EFW	<u>Institutional Factors</u>

### 3.2 Model

To explore the hypothesis of this study, we formulate three basic linear models for the full specification as well as for the subgroup analysis. This is consistent with the recent literature on foreign investment and institutional factors (Alam et al., 2019; Uddin et al., 2019; Shahzad et al., 2020).

Model 1:

$$FDI_{i,t} = \beta_0 + \delta_1 FDI_{i,t-1} + \beta_1 GDP_{i,t} + \beta_2 TO_{i,t} + \beta_3 CF_{i,t} + \beta_4 Employment_{i,t} + \beta_5 GS_{i,t} + \mu_{i,t} \quad (1)$$

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Model 2 incorporates legal system strength, government size, and access to sound money as promoters of FDI in these countries. These institutional and governance factors are examined in model 2 along with GDP per capita.

Model 2:

$$FDI_{i,t} = \beta_0 + \delta_1 FDI_{i,t-1} + \beta_1 GDP_{i,t} + \beta_2 GS_{i,t} + \beta_3 SM_{i,t} + \beta_4 LS_{i,t} + \mu_{i,t} \quad (2)$$

Finally, the paper empirically investigates the impact and sensitivity of economic and institutional factors combined by means of the following model.

Model 3:

$$FDI_{i,t} = \beta_0 + \delta_1 FDI_{i,t-1} + \beta_1 GDP_{i,t} + \beta_2 TO_{i,t} + \beta_3 CF_{i,t} + \beta_4 Employment_{i,t} + \beta_5 GS_{i,t} + \beta_6 SM_{i,t} + \beta_7 LS_{i,t} + \mu \quad (3)$$

Where  $GDP_{i,t}$  denotes GDP per capita,  $TO_{i,t}$  shows trade openness,  $CF_{i,t}$  indicates domestic capital formation,  $GS_{i,t}$  is the size of government,  $SM_{i,t}$  denotes access to sound money,  $LS_{i,t}$  denotes the legal system type, and  $\mu_{i,t}$  represents the error term of the regression model. In the empirical model specifications, lagged FDI (the lagged value of the dependent variable) is included to take into consideration the effect of the previous year's foreign investment on future FDI flows (Peres et al., 2018; Shahzad et al., 2020). In addition, use of the lagged variable helps avoid endogeneity and reverse causality issues (Shahzad et al., 2020). The full specifications of the empirical models are also employed to conduct in-depth subgroup analyses for both panels of countries. In conducting the empirical estimations, we utilize the same set of variables, where GDP is the dependent variable. Specifically, FDI is replaced with GDP in the models estimating the effect on economic growth. To avoid outliers and allow comparability of the means of all factors due to skewness issues, we take the natural logarithm of GDP per capita. In the recent literature on the FDI-growth nexus, Kalai and Zghidi (2017) and Asongu, Akpan, and Isihak (2018) also employed similar techniques.

### 3.3 Estimation Strategy

To examine our primary hypothesis on the interdependence of FDI and growth and the role of institutional factors in FDI and economic growth, we conduct an empirical analysis by employing seemingly unrelated regressions (SUR) and the system generalized method of moments (system GMM) presented by Blundell and Bond (1998), which accounts for AR (1) and AR (2) models with separate unobserved particular factors. The paper uses the SUR method for our full specification and our third model, while the system GMM technique is employed for the subgroup analysis as per the three model specifications. The choice to employ SUR is motivated by the fact that this method can explain the interdependence and intercorrelation of sectors or primary variables (FDI and economic growth), which further allows us to analyze how they are related and what the channel of the relationship is (George, et al., 2019; Farooq et al., 2019; Sarwar et al., 2019; Shahzad et al., 2020).

The system GMM estimation technique is used because it resolves the endogeneity problem by introducing instrumental values of the independent factors and controlling for time-invariant factors (Hillier et al., 2011). Second, this study covers 9 countries (N=9) and 28 years (T=28); that is, the number of countries (N) is smaller than the number of years (T). System GMM is the most suitable estimation method in such cases (Baltagi & Kao, 2001; Bond et al., 2001). Third, forward-differenced instrumental variables in system GMM specifications restrict instrument proliferation (or overidentification) and overcome cross-sectional dependence (see Baltagi, 2008; Love and Zicchino, 2006; Boateng et al., 2018). Such empirical techniques have been used in recent literature (Asongu, et al., 2018; Shahzad et al., 2019). Furthermore, cross-sectional variations are considered in the following specifications. The lagged first difference of the dependent variable in each model is used as a predictor. The following equations sum up the system GMM regression method.

$$\begin{aligned}
 FDI_{i,t} - FDI_{i,t-1} = & \delta_1 FDI_{i,t-1} + \beta_1 (GDP_{i,t-\gamma} - GDP_{i,t-2\gamma}) + \\
 & + \beta_2 (TO_{i,t-\gamma} - TO_{i,t-2\gamma}) + \sum_{h=1}^4 W_h (Y_{h,i,t} - Y_{h,i,t-2\gamma}) + (\mu_{i,t} - \mu_{i,t-\gamma}) + \varepsilon_{i,t-\gamma}
 \end{aligned} \tag{4}$$

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$$\Delta FDI_{i,t} = \delta_1 FDI_{i,t-1} + \beta_1 \Delta GDP_{i,t-\gamma} + \beta_2 \Delta TO_{i,t-\gamma} + \beta_3 \Delta CF_{i,t-\gamma} + \sum_{h=1}^4 W_h \Delta Y_{h,i,t} + \Delta \mu_{i,t} \quad (5)$$

Similarly, we apply the system GMM method for the empirical analysis taking GDP as the dependent variable. In doing so, we use the same set of control variables as in the foreign direct investment specifications in all three models. Section four presents the empirical results, a robustness check and the discussion of the findings in detail.

$$GDP_{i,t} - GDP_{i,t-1} = \delta_1 GDP_{i,t-1} + \beta_1 (FDI_{i,t-\gamma} - FDI_{i,t-2\gamma}) + \beta_2 (TO_{i,t-\gamma} - TO_{i,t-2\gamma}) + \sum_{h=1}^4 W_h (Y_{h,i,t} - Y_{h,i,t-2\gamma}) + (\mu_{i,t} - \mu_{i,t-\gamma}) + \varepsilon_{i,t-\gamma} \quad (6)$$

$$\Delta GDP_{i,t} = \delta_1 GDP_{i,t-1} + \beta_1 \Delta FDI_{i,t-\gamma} + \beta_2 \Delta TO_{i,t-\gamma} + \beta_3 \Delta CF_{i,t-\gamma} + \sum_{h=1}^4 W_h \Delta Y_{h,i,t} + \Delta \mu_{i,t} \quad (7)$$

## 4. Empirical Results and Discussion

### 4.1 Full-Specification Estimations

To study whether the determinants of FDI in MINT countries differ from those in BRICS countries, the system GMM technique is employed to estimate three models for three panels: BRICS and MINT countries, BRICS countries only, and MINT countries only. The estimate of trade openness is significantly positive ( $p < 0.01$ ) in the full panel and MINT specifications. This expected coefficient of trade openness for MINT countries indicates that an open trade policy serves as a significant attraction for FDI inflows. This implies that as these countries open their economies by eliminating trade obstacles and undesirable trade policies while improving industrial efficiency and reducing consumer costs, they increase their output growth, which ultimately raises FDI flows. This outcome is supported by the economic theory of export-led growth (Feder, 1983) and is in line with the findings of Asongu (2015) and Shahzad et al. (2020). However, this relationship is negative and consistent ( $p < 0.01$ ) for BRICS only in the 3<sup>rd</sup> model because these economies may espouse protectionist trade policies that limit foreign investment opportunities. The first-year lag of FDI is highly consistent ( $p < 0.01$ ) in having a positive impact on current FDI in all three specifications, evidencing that FDI is likely to be self-reinforcing (growth and the quality of FDI paper). In other words, a

previous positive FDI record attracts more FDI. This outcome is supported by Peres et al. (2018) for developing countries. Lagged FDI (the dependent variable) is used as an independent variable in this case because it may take 1 to 3 years for FDI to adjust to its equilibrium value in these countries.

Furthermore, the effects of FDI may take time to materialize due to several institutional limitations. The coefficients of GDP growth are significantly positive ( $p < 0.01$ ) in all models for the BRICS. Furthermore, the full specification supports the results on the BRICS. This outcome implies that a larger markets requires higher FDI inflows to take advantage of investment opportunities. Another reason for this positive association is that rising demand for goods and services in these countries drives higher output growth, which ultimately attracts FDI inflows. Surprisingly, however, this estimate is negative and highly consistent ( $p < 0.01$ ) in all models for MINT countries. This implies that higher economic growth in MINT countries reduces FDI inflows, which further reduces the formation of new commercial projects. These outcomes for MINT economies contradict the findings of Asongu, Akpan, and Isihak (2018), who reported a positive association for these countries.

Legal system strength is significant and positive ( $p < 0.01$ ) in all specifications, but its magnitude is higher in MINT economies than in BRICS economies, indicating the relative strength of the legal system in the MINT group. This positive association implies that an impartial and effective legal system gives protection to property rights, which is a prerequisite for FDI (Globerman & Shapiro, 2003; Sethi, et al., 2003). It is a fact that a strong legal system cuts transaction costs for multinational enterprises and ultimately makes external monitoring and enforcement reliable (Khoury & Peng, 2011; Shahzad et al 2019). Furthermore, the legal system can provides shelter for MNEs and allow foreign competition by underwriting market failures (Brewer, 1993; Globerman & Shapiro, 2003; Shahzad et al., 2018), which raises efficiency and eventually expands profitability. Previous studies have reported that a robust legal system significantly lifts FDI by protecting intellectual property rights (Peng, Wang, & Jiang, 2008). This outcome is aligned with the work of Bailey (2018), who argued that institutional factors are the critical determinant of foreign investment for developing countries.

The FDI-capital formation nexus is highly significant ( $p < 0.01$ ) and positive in the models for the BRICS because rising physical capital indicates scaled-up domestic investment in the BRICS, ultimately allowing MNCs to obtain benefits from free-riding on the developed capital formation in the host



economy. However, this association is significantly negative in the full specification and the 3<sup>rd</sup> model for MINT countries, with other factors held constant. The association of FDI with employment is highly significant ( $p < 0.01$ ) and negative in the full specification and first model for BRICS countries, indicating that skilled workers may prefer to work in domestic firms for higher returns instead of providing a free-riding advantage to MNCs. Thus, a rising number of workers in BRICS countries leads to less FDI. However, the 3<sup>rd</sup> model shows a significantly positive association, as the presence of more employed workers equipped with skills and higher productivity may encourage and entice foreign investors. Therefore, while some past studies claimed that multinational companies skim competent labor from the local market and free ride on the skills of the domestically trained labor force (Kalai and Zghidi, 2017), this relationship is unexpectedly inconsistent with the findings for MINT economies.

Government size as an institutional determinant of FDI is significantly negative ( $p < 0.01$ ) in all specifications, but its coefficient for MINT countries is relatively greater in magnitude. The reason behind the negative effect of the size of government might be related to ongoing civil conflicts and violence-related activities in these countries. Due to such activities, the government is unable to add to infrastructure development. These circumstances eventually discourage FDI. In recent work, Uddin et al. (2019) reported a similar conclusion for Pakistan. Another institutional variable, access to sound money, significantly impacts FDI inflows with a positive sign in all specifications. However, its coefficient for MINT countries is relatively higher because their strict legal systems give equal access to the financial system, which accelerates output growth. This access encourages MNCs to invest more in MINT than in BRICS countries. These outcomes are robust in the estimations based on the SUR method.

**Table 3. Full Specification (System GMM Models)**

Variables	FDI			Economic Growth		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
FDI (t-1)	0.4905***	0.511***	0.509***	0.216***	0.195***	0.1929***
Economic Growth (t-1)	(14.42)	(-14.45)	(-13.79)	(-3.66)	(-4.29)	(3.89)
GDP	0.5708***	0.16***	0.357***			
	(9.480)	(2.60)	(-5.44)			
FDI				0.071***	0.012	0.0286***
				(-10.59)	(-0.25)	(-21.33)
Trade Openness	2.2123***		1.822***	-1.171**		-1.2734***
	(7.87)		-5.79	(-17.69)		(7.030)
Capital Formation	-0.022***		-0.034**	0.027***		0.0091***
	(-4.19)		(-5.69)	-21.38		(85.600)
Employment	-0.023***		-0.016**	0.034***	0.029***	0.0313***
	(-8.58)		(-5.48)	-86.13	(-91.63)	(31.780)
Size of Govt.	-0.725***	-0.491**	-0.649**	0.358***	0.231***	0.2781***
	(-17.12)	(-13.61)	(-15.16)	-35.37	(-30.81)	(2.82)
Access to Sound Money		0.108*	0.281***		0.132***	0.0296***
		-2.43	-5.4		(-16.39)	(33.85)
Legal System		0.094***	0.106***		0.172***	0.1639
		-5.27	-4.97		(-43.06)	(42.26)
Constant	2.921	3.304	2.231	3.499	3.067	3.498
	(7.43)	-9.05	(-5.02)	(-39.46)	(-44.01)	(42.26)
Observations	251	251	249	249	249	249
Wald chi2	503.51	476.95	500.78	8309.17	14979.9	13167
VIF test	1.93	1.15	1.93	1.09	1.08	1.35
AR (1)	17.00**	6.18**	6.19	3.19**	3.41**	2.58**
AR (2)	-5.13**	-5.30**	-5.62	-1.15*	0.47**	0.16**
Number of Instruments	230	205	204	230	231	230

Note: \* p<0.05, \*\*p<0.01, \*\*\* p<0.001.

**Table 4. Estimated Coefficients from SUR method for FDI and Economic Growth**

Variables	FDI	Economic Growth
FDI (t-1)	0.4893*** (6.830)	0.2564 (1.120)
Economic Growth (t-1)	0.5783*** (4.230)	
GDP		0.0954*** (3.530)
FDI		
Trade Openness	2.990*** (4.710)	-1.4527*** (-5.020)
Capital Formation	-0.0509*** (-3.960)	0.0131** (2.160)
Employment	-0.0294*** (-5.200)	0.0336*** (20.210)
Size of Govt.	-0.7556*** (-8.170)	0.3455*** (8.200)
Access to Sound Money	0.3780*** (3.790)	0.0225 (0.470)
Legal System	0.0983** (2.100)	0.0998*** (4.790)
Constant	1.3033 (1.380)	3.2409 (8.350)
Observations & Countries	9 Countries (252 observations)	
Adj. R2	0.3391 ***	0.7099 ***
Breusch-Pagan correlation test	3.184***	

Note: \* p<0.05, \*\*p<0.01, \*\*\* p<0.001.

4.2 System GMM Estimations for BRICS and MINT Countries

**Table 5. System GMM Results for BRICS Countries**

Variables	FDI			Economic Growth		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
FDI (t-1)						
Economic Growth (t-1)	0.5142***	0.5250***	0.5231***	0.1051	0.3186***	0.0628
GDP	0.6815***	0.3073***	0.2290**			
FDI				0.0800***	0.0837***	0.0208**
Trade Openness	0.8079*		-1.303***	-2.281***		-2.6152***
Capital Formation	0.0269***		0.0345***	0.0540***		0.0495***
Employment	-0.016***		0.0082*	0.0430***	0.0303***	0.0439***
Size of Govt.	-0.558***	-0.5373**	-0.3904**	0.3647***	0.1909***	0.3362***
Access to Sound Money		0.4759***	0.4356**		0.0363***	0.0069
Legal System		0.1768***	0.1829**		0.1105***	0.1258***
Constant	0.0350	-0.7505	-1.6655	2.513	3.7773	2.1348
Observations	251	251	249	249	249	249
Wald chi2	485.12	577.36	500.78	3988.06	7341.4	5062.68
VIF test	1.93	1.15	1.93	1.09	1.08	1.35
AR (1)	4.90**	1.53**	6.19	3.57**	4.57**	2.91**
AR (2)	-4.32**	-5.27**	-5.62	-0.65**	1.86**	0.45**
Number of Instruments	133	132	132	134	134	134

Note: \* p<0.05, \*\*p<0.01, \*\*\* p<0.001.

To estimate the GDP equation, we use the same control variables in all three models. However, foreign direct investment serves as the key explanatory variable in the first model and institutional factors that in the second model. The estimated long-run impact of FDI on GDP is highly significant (p<0.01) and positive in the BRICS and the full specification, as predicted by theory. FDI may enhance the adjustment ability of the economy by supporting the efficient allocation and mobilization of productive resources, which ultimately spurs economic growth. Hence, a rise in FDI flows to BRICS nations further fosters their output growth. A 2013 UN report noted that BRICS continuously performed well in attracting FDI, accounting for more than 1/5 of global FDI

after the financial crisis of the early 21<sup>st</sup> century (Peasah & John, 2016). However, FDI has a negative and significant impact on GDP growth in MINT economies, where the efficiency of FDI in advancing production per capita is questionable, as this effect depends upon the level of FDI. Thus, this result highlights that FDI inflows are not a suitable mechanism for enhancing output growth in MINT countries. Lagged output growth displays a positive and highly consistent association ( $p < 0.01$ ) with current output growth in all specifications except the first and third models in the case of the BRICS. In addition, the inclusion of lagged output growth raises the explanatory power of the other control factors in the model (Peres et al., 2018; Shahzad et al., 2019). Surprisingly, trade openness has a significantly negative influence on GDP in all specifications; indeed, a higher degree of openness may dampen growth due to a more significant import bill deteriorating countries' balance of payments. Another possible reason for the negative effect of trade openness on output growth is that these economies may not export diversified items, which is essential to securing the benefits of trade openness for output growth (Ahmed & Suardi, 2009). The findings are similar to those of Olufemi (2004) for Nigeria.

Capital formation has a highly significant favorable influence on economic growth for the full and BRICS specifications. In fact, an increase in physical capital indicates scaled-up investment activities in the BRICS that facilitates economic growth (Peasah & John, 2016). Surprisingly, this relationship is significantly negative in the case of MINT countries. The relationship between employment and economic growth is highly significant and positive in all specifications. This indicates that greater employment with higher skill and productivity levels spurs economic growth, in line with the endogenous growth model (Kalai & Zghidi, 2017).

In our empirical outcomes, the legal system's association with economic growth is highly significant and positive in all specifications, as it promotes investment opportunities by decreasing managerial expropriation and improving law enforcement and the defense of patent rights (Seitz & Watzinger, 2017). This result is also supported by recent studies (Asongu, Akpan, & Isihak, 2018; Kalai and Zghidi, 2017). Access to sound money is positively associated with output growth at a significance level of 1% because strict rules in these fast-growing nations provide equal access to sound money for their citizens, which brings economic growth.

Government size positively impacts output growth at a high significance level ( $p < 0.01$ ) in the full and BRICS specifications; larger governments have

an enhanced capability of regulating output growth and raising the effectiveness of public policies (Garcia-Sanchez et al., 2013). Uddin et al. (2019) state that public expenditure can be effective in providing an auspicious investment atmosphere. It is also noted that a large government, measured by higher public investment and taxation and increased transfer payments and consumption, helps promote output growth by redistributing wealth and encouraging foreign investment (Yuan et al., 2010). The positive impact of public spending is consistent in emerging economies due to their higher marginal benefit of public spending, which attracts foreign investment and stimulates output growth. Asimakopoulos and Karavias (2016) also report that emerging economies at the upward-sloping part of the spending curve receive more benefits from higher public expenditure. This relation is also highly consistent for MINT countries but surprisingly negative. The estimated coefficients of the SUR method are consistent with the system GMM empirical results. In short, the outcomes of this study are new and consistent.

**Table 6. System GMM Results for MINT Countries**

Variables	FDI			Economic Growth		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
FDI (t-1)						
Economic Growth (t-1)	0.4804***	0.4223**	0.4699***	0.3337***	0.2967***	0.2078**
GDP	-0.2071*	-0.875***	-0.8066**			
FDI				-0.0320**	-0.0945**	-0.0794***
Trade Openness	1.0336*		1.985***	-2.268***		-1.857***
Capital Formation	-0.0784**		-0.0971**	-0.0114**		-0.0284***
Employment	0.0216**		0.0064	0.0566***	0.0322***	0.0438***
Size of Govt.	-0.399***	-0.7315**	-0.5530**	0.0447*	-0.1233**	-0.0767***
Access to Sound Money		0.9530***	1.1514***		0.4777***	0.2970***
Legal System		0.2474***	0.3596***		0.1617***	0.1690***
Constant	6.6506	8.3099	5.6865	6.5820	4.4042	5.8447
Observations	251	251	249	249	249	249
Wald chi2	237.24	263.61	309.06	4783.70	6410.83	5586.88
VIF test	1.93	1.15	1.93	1.09	1.08	1.35
AR (1)	7.18**	5.04**	3.57	-1.17**	0.07**	0.09**
AR (2)	-3.17**	-2.67**	-2.66	-0.67**	-0.99**	-1.44**
Number of Instruments	107	108	107	107	108	107

Note: \* p<0.05, \*\*p<0.01, \*\*\* p<0.001.

#### 4.3 Robustness Check

Table 7 reports the results of a robustness analysis employing the feasible generalized least squares (FGLS) method for the full specification. In the robustness check, we further explore how different institutional factors respond to economic growth and foreign investment in fast-growing economies. The main reason to conduct the robustness analysis is to confirm whether its results are in line with the main findings of the paper and thus that our estimations are not spurious. The FGLS estimations indicate that GDP has a significant and positive relation with FDI. Additionally, we find a consistent

response to trade openness, the capital stock, and institutional factors. Based on the overall findings, the paper argues that trade globalization, government expenditures, subsidies and services, and legal system strength might be the key determinants of foreign investment and economic growth. Especially for trade openness, the results are significantly positive for FDI and negative for GDP, demonstrating that trade openness (exports and imports) plays a vital role in influencing the economic growth of BRICS and MINT countries. The FGLS outcome shows that there is no autocorrelation, and the panels are homoskedastic as per panel data assumptions. The empirical outcomes are consistent with the conclusions of Jadhav (2012) and Asongu (2015). The findings underscore the robustness of our main findings in the paper and further allow us to draw novel conclusions in the context of incoming FDI for the reshaping of economic policies. Hence, the study concludes with novel arguments and presents the policy implications for economic activity in the sample countries.



**Table 7. Robustness Check with FGLS Regressions**

Variables	FDI			Economic Growth		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
GDP	0.424** (-2.89)	-0.95 (-0.64)	0.269 (-1.82)			
FDI				0.077** (2.89)	0.017 (-0.64)	0.049 (1.82)
Trade Openness	1.778** (-2.76)		2.327*** (-3.52)	-1.164*** (-4.34)		-1.213*** (-4.37)
Capital Formation	-0.03 (-1.33)		-0.100*** (-5.14)	0.025*** (-4.8)		-1.213*** (-4.37)
Employment	-0.013 (-1.05)	-0.008 (-1.35)	-0.046*** (-3.31)	0.035*** (-21.84)	0.031*** (-19.28)	0.011 (-1.87)
Size of Govt.	-0.566*** (-5.74)	-0.414*** (-4.50)	-0.53*** (-4.41)	0.347*** (-8.95)	0.250*** (-6.66)	0.011 (-1.87)
Access to Sound Money		0.226* (-2.41)	-0.019** (-3.08)		0.139*** (-3.51)	0.042 (-0.93)
Legal System		0.101* (-2.17)	0.37*** (5.42)		0.107*** (-5.63)	0.097*** (-4.73)
Constant	2.812 (-2.99)	2.639 (-2.90)	-0.570 (-6.04)	3.603 (-10.73)	3.212 (-9.48)	3.523 (-9.94)
Wald chi2	35.52	37.24	62.17	537.45	537.76	608.20
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Autocorrelation	No	No	No	No	No	No
Panels	homoskedastic	homoskedastic	homoskedastic	homoskedastic	homoskedastic	homoskedastic

Note: Robust z-statistics are shown in parentheses. \* p<0.05, \*\*p<0.01, \*\*\* p<0.001.

## 5. Concluding Remarks and Policy Implications

The primary objective of this paper was to analyze the nexus between foreign direct investment (FDI) and economic growth for BRICS and MINT economies. To do so, we incorporated macroeconomic and institutional factors as explanatory variables for robustness and to check that our results are not spurious. For the empirical estimations, the paper used annual data from 1990 to 2017 and employed the system GMM estimation technique. The study contributes to the academic literature in two ways. First, it extends previous research on BRICS countries by using the macroeconomic and

institutional variables together in the empirical analysis. The institutional framework is very closely related to the investment decisions of investors and the performance of emerging economies, while it also affects strategic investment decisions (Alam et al., 2019). Second, the paper offers an in-depth analysis of the FDI-growth relationship for BRICS and MINT countries, which allows us to draw novel conclusions and outline the implications for both fast-growing groups. Concerning academic contributions, the article provides relevant policy implications for the utilization of domestic and foreign investment to spur living standards and to boost economic growth.

FDI and capital flows are very beneficial for emerging economies, as they help mitigate several socioeconomic problems, such as poverty and unemployment. Incoming investment helps macroeconomic growth. It expands the country's investment base and helps eradicate unemployment and introduce advanced technology and marketing, which encourages economic growth. Similarly, several institutional determinants, such as legal system robustness, government size, and government effectiveness, help build investor confidence and increase foreign investment.

The empirical estimations for the full panel reveal that economic growth, trade, access to sound money, and legal system strength positively affect FDI and help attract foreign investment in these countries. Specifically, these factors offer a positive signal to investors and foreign firms. Additionally, this study finds a strong significant relationship between foreign investment, domestic capital, access to sound money, legal system robustness, and employment with the economic growth of these emerging economies. This relationship is explained by the fact that institutional determinants are closely related to the economy, as they show the attitudes and intentions of the host country towards its economy.

The empirical estimations for the BRICS revealed that FDI and economic growth have a significant bidirectional relationship with each other with reference to the relevance of institutional determinants. The significant and positive effect of FDI shows that FDI boosts economic growth and that improving economic growth attracts more foreign investment. This relationship also indicates that FDI contributes to the transfer of technology and skill from foreign firms and that this is possible due to access to sound money, a strong legal system, and robust property rights. Notably, the results indicate that foreign investment and economic growth are not only sensitive to domestic factors but also quite sensitive to the institutional environment, represented by political and institutional indicators. Moreover, employment

and domestic capital can act as an important tool for the transfer of technology in emerging economies by offering enticing opportunities to industries and firms.

In conducting the empirical analysis for the subgroups, we find very surprising and novel findings for MINT countries. It is evident from Table 4 that economic growth, domestic capital, and government size negatively influence foreign direct investment. The study finds that domestic capital, foreign investment, trade, and government size adversely affect the economic growth of MINT countries. The finding of a bilateral negative association between FDI and growth for MINT countries is very novel and allows us to recommend new policies for the economies of these countries. The negative effect of FDI is explained by foreign investment being channeled mainly to extractive sectors, which lack integration with other sectors of the domestic economy in MINT countries. The findings highlight two reasons for this. First, MINT countries are facing issues such as refugee and undocumented immigrant influxes as well as domestic terrorism. For this reason, related socioeconomic problems might prevent FDI from contributing to economic growth. Second, the negative effect of government size and trade indicates that the major problem might be the efficiency and effectiveness of government and that policymaking issues might hinder the growth process.

Finally, we propose multiple fruitful policy implications for FDI and economic growth in relation to institutional factors. For BRICS countries, the paper provides the following key recommendations. First, BRICS economies should focus more on the utilization of foreign and domestic investment for sustainable economic growth and improvements to living standards to raise per capita GDP. In addition, several institutional and trade-related policies require reforms to improve economic growth. BRICS countries have a golden opportunity to increase exports through the One Belt One Road initiative. Second, long-term economic reforms should be implemented to mitigate socioeconomic problems. MINT economies need to reform their trade and capital restriction policies by lowering the corporate tax rate, reforming the corporate governance structure, and increasing employment opportunities by improving resource allocation and economic efficiency to attract more foreign investment. The reason for these recommendations is that foreign investment in these countries may not have reached the threshold at which it can contribute to economic growth. Additionally, we recommend introducing new policies to improve manufacturing sectors, e.g., bridging the manufacturing skills gap through labor training programs, embracing more flexible work

structures and implementing on-the-job training initiatives, among others. Furthermore, MINT countries need to implement socioeconomic reforms to mitigate terrorism and violence to better utilize investment opportunities.

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### Endnotes

<sup>1</sup> By “investment”, the paper refers to all investment types, including domestic, foreign, private, and public or portfolio investment.

<sup>1</sup> The paper studies nine countries: the BRICS and MINT countries. The MINT countries are Mexico, Indonesia, Nigeria, and Turkey. The latter term for these fast-growing countries was coined by Jim O'Neill ("The Mint countries: Next economic giants?," 2014).

<sup>1</sup> The Human Freedom Index and World Freedom Index report several indicators concerning institutional factors (<https://www.fraserinstitute.org/>).



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