THE DIRECT AND INDIRECT IMPACT OF PUBLIC PRIVATE PARTNERSHIPS IN INFRASTRUCTURE ON THE GDP OF DEVELOPING COUNTRIES

BY

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is accepted by the Graduate Thesis Committee as satisfying the thesis requirements for the degree of Master of Business Administration with a Major in Management.

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DECLARATION

I, **Araz Sarkis Nashalian**, declare that the research work reported in this dissertation is my own, except where otherwise indicated and acknowledged. It is submitted for the degree of Master of Business Administration with a Major in Management in the Haigazian University. This Thesis has not, either in whole or in part, been submitted for a degree or diploma to any other universities.

Araz Sarkis Nashalian

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DEDICATION

I would like to dedicate my thesis to my beloved parents.

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ABSTRACT

The Millennium Development Goals, which were approved by the leaders of 189 countries at the United Nations Millennium Summit in 2000 and Sustainable Development Goals agreed on 2015, promote Public-Private Partnerships (PPP) in infrastructure as a vehicle for growth and as a means to eradicate poverty in developing countries. This thesis examines the direct and indirect impact of public-private partnerships' (PPP) investments on GDP in developing countries. The model builds on Solow's neoclassical production function taking into account the traditional factors of production, capital and labor, to which are added other contributors to growth, such as human capital and the institutional quality, two other dimensions developed by Robert Lucas, Douglas North and Paul Romer. Panel regressions with fixed effects on a sample of 81 developing countries for the period of 2000-2016 provide evidence that PPP infrastructure investments have a positive impact on GDP per capita. The results also confirm that the marginal effect of the labor force participation rate, other investments and the human development index on GDP per capita are further enhanced by such investments. Furthermore, the results show that the marginal effect of investments in PPP on GDP per capita depends itself on the host country's regulatory quality.

Keywords: **Public-Private Partnerships**, **Developing Countries**, **Economic growth**, **Labor Force**, **Human Capital**, **Institutional Quality**.

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LIST OF ABBREVIATIONS

BLT	Build, lease, and transfer
BOO	Build, own, and operate
BOOT	Build, Own, Operate and Transfer
BOT	Build, operate, and transfer
BROT	Build, rehabilitate, operate, and transfer
CDIAC	California Debt and Investment Advisory Commission
DBO	Design-Build-Operate
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EPEC	European PPP Expertise Centre
EU	European Union
FDI	Foreign Direct Investments
GDP	Gross Domestic Product
GIF	Global Investment Facility
ICT	Information and Communication Technology
IFI	International Financial Institutions
ILO	International Labor Organization
MDB	Multilateral Development Banks
MENA	Middle East and North Africa
ODA	Official Development Aid
OECD	Organization for Economic Cooperation and Development
PFI	Private Finance Initiative
PPI	Private Participation in Infrastructure
PPP	Public Private Partnership
RLT	Rehabilitate, lease or rent, and transfer
SDG	Sustainable Development Goals
UN	United Nations
WB	World Bank
WGI	World Governance Indicators

INTRODUCTION

Traditionally public services were provided solely by the public sector, to keep pace with the competitive, innovative market of the private sector, many economies started to promote privatization of the public facilities and services. For the last decades, the Public-Private partnerships emerged as a middle solution between traditional public ownership and privatization and earned popularity among different countries in the world. In the rapid technological advancement age, the traditional responsibility of the public sector in providing public goods and services to its citizens has seized to be an effective way of satisfying the basic needs of the population. The public sector was unable to build, operate and maintain advanced and innovative infrastructural facilities and provide efficient services to the citizens.

Starting from the 80s and up to these days, many countries have seen in the new public administration a new model for public governance and a mean for the private innovative and efficient operation and management systems to join and improve the services provided.

Developed countries were quick to adopt this framework and have succeeded in renewing their infrastructures, educational and health care systems employing the creativity and innovative intelligence of the private sector. Throughout the years and considering most of the countries in the world, investments in electricity, water, transport, and ICT have contributed to the economic growth of their countries. On the other hand, most of the developing countries lack the necessary infrastructure to ensure the satisfaction of the basic needs of their citizens, human capital, employment, and economic growth levels face critical situations. Infrastructure is seen to be at the basis of the development of many products and services and developing countries who lack this necessary foundation are

unable to support sustainable development. Here comes the role of public-private partnerships. The United Nations in its "2030 agenda" targets sustainable development and promotes connections between public and private entities as one of its primary goals. Hence, more and more countries are developing laws and policies and directing their focus towards these partnerships.

As an economist who sees in sustainable development a way to overcome economic hardships faced by most countries of the developing world, my aim in this thesis paper is to examine the effect of public-private partnership investments in infrastructure on GDP considering the different components that contribute to sustainable development and economic growth.

Research question: what is the impact of public-private partnership in infrastructure on the GDP of the developing countries?

Research objective: to examine the impact of public-private partnerships particularly in infrastructure on the GDP of the developing countries and to evaluate the strength of the effect.

Research methods: scientific literature analysis, statistical data analysis, econometric analysis, document analysis.

The paper is arranged as follows: First, a general overview about the public-private partnerships around the globe from its emergence until today; second, examination of previous works regarding the link between PPPs and their contribution to economic growth; third, the in-depth analysis about the effect of PPPs on the GDP of the developing countries considering also their impact on the other components of GDP; finally, a list of recommendations.

CHAPTER 1: PREFACE: FROM PRIVATIZATION TO PPPS

1.1. Historical Overview

Historically, public involvement in any country was seen as a natural monopoly; services were provided through federal agency networks leading to demand inelasticity and pricing control by the mono-polar. During the period between the 1980s and 1990s, many developing and transitional economies have witnessed the introduction of private sector participation in public monopolized sectors as electricity, water, and sanitation services, while others retained their public utilities in the hands of their governments(Gassner, Popov, & Pushak, 2007).

Privatization of public goods and services started to gain popularity in the 1980s when the British government energized the economy by privatizing different sectors including coal, steel, oil, and electricity (CDIAC, 2007). Later, to reduce the public sector role in the economy, UK governments went beyond the basic privatization framework to adopt the Public-Private Partnership "PPP" measures. Especially during Tony Blair's government in 2004, who directed his policy towards shifting the funding of the infrastructure from the public to the private (Hall J. , 1998) resulting in a commitment of 35.5bn towards the UK government for a vast number of PFI contracts (Graeme & Cartsen, 2007). His "New Labor" government based its entire social policies on rejuvenating urban areas and youth unemployment through PPPs (Falconer & Ross, 1998).

The world adopted PPP as a new public policy in the late 1990s, for its cost efficiency, operations effectiveness, and development of socially inclusive communities. In most countries, as a result of increased social demand for high-quality public services, high

governmental budget shortfalls, and public debts, awareness about partnership models became widely spread to relief the governments from budgetary pressure and provide superior services (Graeme & Cartsen, 2007).

Countries as Australia and US followed UKs experience in using PPPs in their operating systems (Gray, 2002) stimulating urban communities in the case of the later (Aspen, 1997) (Podziba, 1998).

Following the annihilation of communist regimes, countries as Hungary have used PPPs to battle social marginalization, offer public facilities and develop civil society (Hodge & Greve, 2007).

After the end of the cold war, with the support of the World Bank and International Monetary Funds, many developing countries have adopted free market and open trade principles, finding in PPPs a way to reactivate the deteriorating public sector, shrink budgetary burdens and increase operation efficiency (Jamali, 2004).

PPPs in infrastructure, manufacturing, and services sectors are well known for providing better value for money, expanding services provided to citizen's, and offering flexibility and better planning opportunities (Nijkamp, Van Der Burch, & Vidigni, 2002).

Today, as a result of increased social demand for high-quality public services, high governmental budget shortfalls, and public debts, many countries have found in PPPs a middle solution between traditional monopolistic structures and pure privatization (Mazouz, Facal, & Viola, 2008) and a mean for overcoming the infrastructure gap and weak fiscal positioning. Those countries range from advanced OECD countries, as Australia, Ireland, Canada and Japan to Continental European countries as Finland, Germany, Greece, Italy, Netherlands, Portugal, Spain to Central and Eastern European

countries, such as Czech Republic, Hungary and Poland to less developed countries, Mexico and Asian counties especially in Korea and Singapore (EuropeanCouncil, 2003).

As the awareness about PPP models expanded, international institutions in their turn encouraged its use as a socio-economic tool for developing infrastructure, believing that improved support would generate economic growth through enhanced productivity and competitiveness (De Bettignies & Ross, 2004).

1.2. Privatizations vs. PPPs

Privatization and PPPs both refer to the private participation in public projects, with the objective of efficient operation and financial profits. The main difference between the two is that the first is characterized by the complete transfer or selling of the public assets to the private sector. While the latter is described by determining the level of involvement of both parties, keeping the ownership with and giving the authority to the public sector to reclaim complete control of the asset or enterprise if the private entity fails to meet the contractual expectations (CDIAC, 2007).

Privatization is characterized by transferring publically owned agencies and properties from the government into the private sector, generating market-based competition for products and services. It has many forms and can be used on industrial, service-oriented initiatives as well as publically owned assets. Privatization may result in: operations efficiency, innovation and high quality of services reducing government operating expenses. The main disadvantage of Privatization is the loss of governmental control on the agency or the asset as well as loss of public employment (CDIAC, 2007).

- *Privatization*: is the process of transferring the ownership from the public to the private sector "The transfer of a business, industry, or service from public to private

ownership and control" (Oxford, 2018), it is the process of sale of government property to the private sector (Cambridge, 2018).

Privatization takes different forms, depending on the nature of the facility and the services or products delivered. The various forms include:

Table 1: Types of Privatizations

Divestiture	The private partner purchases public sector facilities and the government doesn't have any role in the management of the asset.
Self-help	The private partner is authorized by the public sector to take over a public facility and provide services for the citizens.
Vouchers	The private sector is given financial subsidies by the public entity for the purchase of specific goods and services from the public sector.
Contract Services	The private partner is contracted to deliver a specific service.

Source: (WorldBank, 2018)

Public-private partnerships are characterized by the sharing of common goals, risks, and rewards among the private and public parties. It is mainly defined as a project where private, and public parties collaborate in design, development, construction, operation, ownership, financing as well as maintenance of an infrastructure entity. A contractual agreement is set between the private and public partners through which assets of each party are utilized, and their roles, responsibilities, and expectations are listed, motivating them to deliver on time and budget. PPPs depending on their nature can take different forms including: design, build, operate, finance or transfer of the public assets, each having separate contracts to guide the project. PPPs reduce the cost of public agencies, improve their working efficiency and provide a better service, which makes them very suitable for infrastructure projects. In PPP projects the public entities benefit from the

private party's knowledge and expertise in providing superior services to the users and result in cost savings. Their input in the project will be more of contract management than a day to day operations. PPPs are more complex and differ from traditional procurements, require more provisions, organization, control, and synchronization, which increases the costs of the project. A team of specialized advisory, consultancy, contract management, and legal personnel are needed to supervise and oversee the plan for a long-term period (CDIAC, 2007).

- *Public Private Partnership*: There is no one set definition for public-private partnerships (PPPs), Scholars have defined PPPs in different ways, some consider it a collaboration between public and private sectors (Wettenhall, 2003), aiming mutual benefits (Osborne, 2000), others connect it with infrastructure projects through separate organizational units created from joint agreements between Public and private partners while another group views it as an instrument of governance (Teisman & Klijn, 2001,2002).

  Van Ham, Hans, and Koppenjan summarize the PPP definition as follows "A cooperation of some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs, and resources which are connected with these products" (Van Ham & Koppenjan, 2001).

  While according to the International Labor Organization (ILO), PPPs are a collaboration between public and private sectors, through which both parties join their efforts, share their resources and expertise to accomplish mutual purposes(ILO, 2006).

PPPs have evolved to take many forms from financing, designing and operating, to ownership of public facilities. The different forms include:

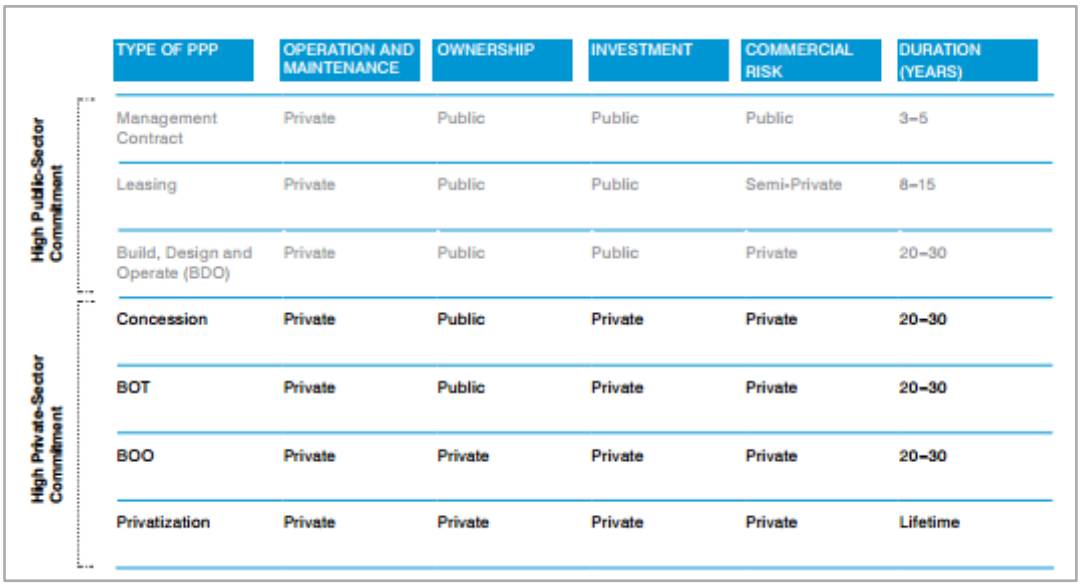
Table 2: Types of PPPs

Type	Definition
Management Contracts	The private partner for a defined period is paid to manage the enterprise, while the public partner bears the operational risk entirely.
Lease Contracts	The private partner for a defined period of time manages and carries the operational risk in return for a payment.
Concessions	The private partner manages and bears the investment risk of a publicly owned facility for a defined period of time.
Rehabilitate, Operate, and Transfer (ROT)	The private partner, rehabilitates and operates a public enterprise, covering all the risks associated with it and transfers the facility to the public sector at the end of the defined period by the contract.
Rehabilitate, Lease or Rent, and Transfer (RLT)	The private partner leases, rehabilitates the public enterprise and bears all the operational risk for a defined period.
Build, Rehabilitate, Operate, and Transfer (BROT)	The private partner builds on public enterprise, runs it and bears the risks for a defined period and then transfers back to the public entity.
Build, Lease, and Transfer (BLT)	The private partner builds a new enterprise for the public sector, then leases it from the public entity and operates it bearing all the operational risks and transfers back after the end of contract period. In this case revenue guarantees are provided by the government.
Build, Operate, and Transfer (BOT)	The private entity builds a new enterprise for the public sector, operates it bearing all the operational risks and transfers it back to the public entity at the end of the defined period by the contract. The government in this case also provides revenue guarantees.

Build, Own, and Operate (BOO)	The private partner builds a new enterprise, owns and operates and bears all the operational risks, while the public sector provides revenue guarantees.
Design-Build-Operate (DBO)	The private entity designs, builds and operates the facility.
Turnkey	The private partner designs and builds the facility according to specific criteria and bears all the risks and unforeseen costs.

Source: (WorldBank, 2018)

Table 3: Comparison between Privatization and PPPs



	TYPE OF PPP	OPERATION AND MAINTENANCE	OWNERSHIP	INVESTMENT	COMMERCIAL RISK	DURATION (YEARS)
High Public-Sector Commitment	Management Contract	Private	Public	Public	Public	3–5
	Leasing	Private	Public	Public	Semi-Private	8–15
	Build, Design and Operate (BDO)	Private	Public	Public	Private	20–30
High Private-Sector Commitment	Concession	Private	Public	Private	Private	20–30
	BOT	Private	Public	Private	Private	20–30
	BOO	Private	Private	Private	Private	20–30
	Privatization	Private	Private	Private	Private	Lifetime

Source: (Booz&Co., 2006)

1.3. Advantages and Disadvantages of PPPs

There are two sides to every coin, in different parts of the world, countries have contrasting views on PPPs, some consider it a problematic approach while others are charmed by the details of the contracts (Bowman, 2000). From the 1980s to today, there are many success and failures examples when considering different countries (Hodge & Greve, 2007).

According to Xueqing Zhang the following factors: Favorable investment environment, Economic viability, Reliable concessionaire consortium with strong technical strength, Sound financial package, and appropriate risk allocation via reliable contractual arrangements determine the success and of a PPP infrastructure project (Zhang, 2005).

Advantages:

Many authors have seen in PPPs an arrangement that serves both parties "marriage made in heaven" and described it as a successful method for public management.

Table 4: Advantages of Public-Private Partnerships

Advantages	Description
Cost Reduction and Overcoming Fiscal Limitations	- A 17 % costs reduction in overall expenses was recorded as a result of PPP partnerships and a 10-30% savings from the transfer of risk from the public to private sector. - A rise of 15-20% of the capital budget per year. - Taking the example of UK in its first DBCO road projects, there is on average 15% savings on costs, a 10% savings on Bridges when comparing its PFI platforms to the traditional procurement, 60% on the national insurance recording system and 40% on IT project for Home office immigration(Zhang, 2005). - PPP projects limit the public spending and help overcome risks of inflation in the light of increased federal deficit and debts.
Efficient Management and Labor Productivity	Efficient Management: - Some experts consider PPP a way to solve the problem of governance in governmental institutions aiding in transparency and accountability and creating collaboration in the decision-making process (Salamon, 1995). - Another reason for employment of PPPs is the rising interest in e-government, which has urged public institutions who lack experience in new technologies to seek private company's knowledge and investment programs in ICT sector (Langford & Harrison, 2001).

	Labor Productivity: - Gassner sees in PPPs a way to improve labor productivity. In Latin American countries, considering telecoms, electricity and water sectors, and public private partnership projects have been proven to increase the investment, labor productivity and quality while decreasing unemployment levels(Gassner, Popov, & Pushak, 2007). - According to (Megginson, Nash, & Van Randenborgh, 1994), privatization results in labor force growth, since private companies have expansion strategies to improve their efficiency. They also tend to improve the investment and profitability of the facility.
Improved Service Quality	- According to Gassner, a shift in management from the public to the private, improved quality of services and boosted the profits. He gave the example of the electricity sector and showed an increase in output in the industry, improvement in performance, and service quality while recording reductions in distribution losses and levels of employment. - PPPs were used in developing countries to enhance the performance of the public sector through innovative solutions, cost reductions, competition and reduction of the national budget(Gassner, Popov, & Pushak, 2007).

Disadvantages:

Not all the conclusions are definite when it comes to PPP arrangements, some UK authors including Pollock (Pollock, Shaoul, & Vickers, 2002) have criticized PFI measures. According to them PPPs are considered to be an inadequate way of representing the public "public fraud and false accounting ... commissioned and directed by the Treasury." (Monbiot, 2002).

Table 5: Disadvantages of Public Private Partnerships.

Disadvantages	Description
Complex Contractual Services and Mal-Administration	- Contractual section of PPP agreements for infrastructure and services may seem complicated and lacking transparency (Monbiot, 2002) getting the public sector to enter into agreements that lie over several decades. - Many defects have resulted from PPP projects including high complexity, weak public sector contract management skills, conspiracy in choosing partners and high asset specificity. There has been evidence of maladministration in PPP projects for over decades, which most of the time is unrecognized. - Structural issues have arisen in PPP arrangements (Monbiot, 2002) and "institutional Paradigm" (DiMaggio & Powell, 1988), problems including management and costs associated with it.
Accountability	- In some cases, as Australian infrastructure projects, PPPs were misused to cover the financial dealings and record them off balance. - while in the US PPP arrangements were seen as "wasteful and risky" and Europe witnessed the "scandal in the history of Danish public Administration", considering Denmark's Farum PPP case, which resulted in complete failure, expulsion of the mayor and increase of taxes on the citizens by 3.2% to cover the loss. - Australian Walker considers PPPs to be the most indigent entrepreneurial cases and accountability situations to the parliament and the public (Greve, 2003).

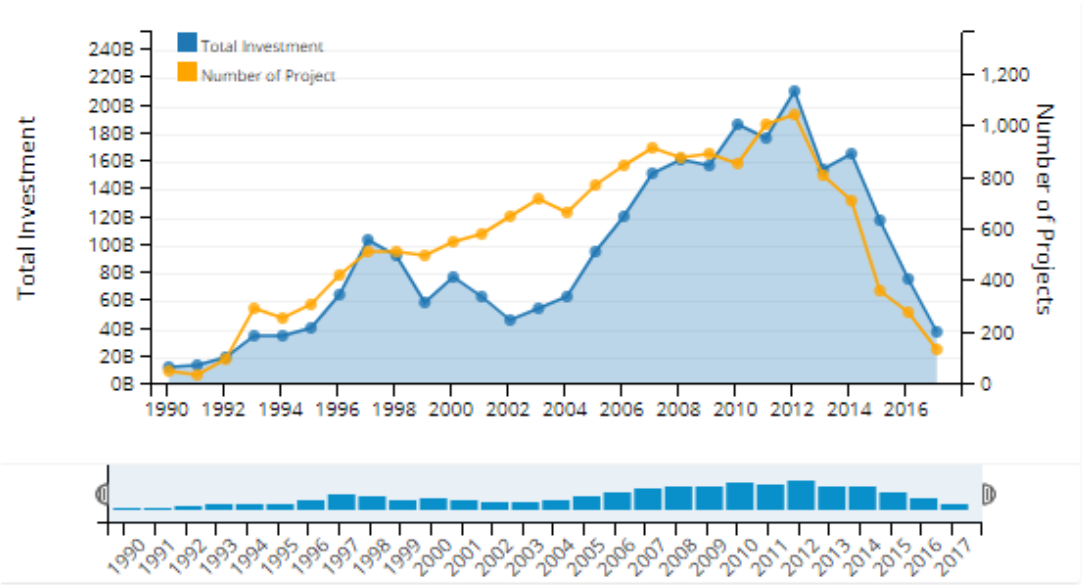
Financial Risks	- U.S. critics such as Bloomfield, suggest that lease purchase financing measures were 7.4% more expensive than traditional financing and overstated sales volumes masked the costs and risks to the public (Hodge & Greve, 2005). - Analysis on 250 projects by London Underground from 1997-2000 showed a 20% overrun of expenses, is a proof of projects which were completed late and above specified budgets, Jubilee Line transportation was six years late and 30% over budget. - PPPs are seen as a burden on the taxpayer and public fraud (CEC, 2010) Cost and benefits cannot be projected accurately, and benefits are generally overestimated while costs underestimated especially in public infrastructure project (Prud'homme, 2005).

1.4. PPP Markets Worldwide

PPPs witnessed progressive growth starting from the 1990s until 2007 (CEC, 2007), following a financial and economic crisis in 2008, which affected the PPP market and recorded a 34% decline in EU countries. The EU was quick in its anti-recession plan to reduce the continuing deterioration of the PPP market. The global crisis had its implication on the economic activities around the world, resulting in downward shifts in the GDPs and investments (CEC, 2008).

Some suggest that during periods of recession, when governments are in public budget shortages a need for external sources to finance public infrastructure increases the PPP investment (Hall D. , 2008), while others consider that economic growth with high federal budgets enables the governments to initiate PPP projects(Jasiukevicius & Vasiliauskaite, 2013).

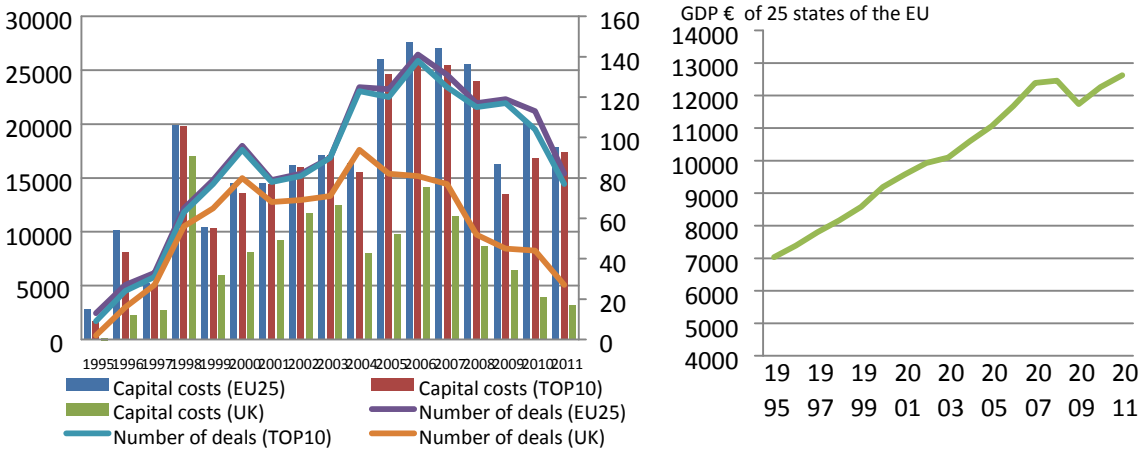
Figure 1: Total Investment from the years 1990 to 2016



Source:(WorldBank, 2017)

According to the World Bank, when comparing the countries belonging to an upper-middle-income group to the ones belonging to the low-income group, the first group attracted more PPP investments. Considering the data from 1987 to 2017 low-income countries have attracted only 9% of the total PPP investments, while middle-income countries attracted 32% and high-income countries attracted 59% for the same period. The reasons behind these figures may vary from financial, political, macroeconomic to regulatory risks, following frameworks will be discussed later in details(WorldBank, 2017).

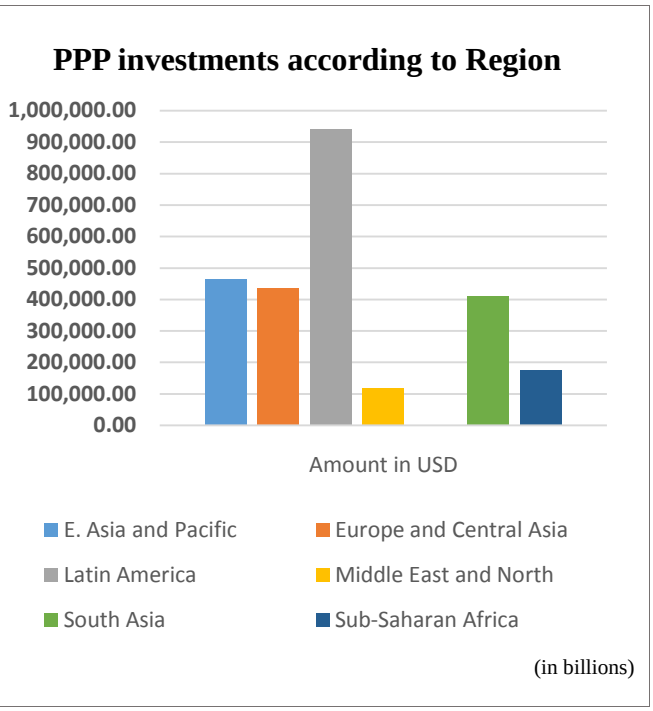
Figure 2. Comparison between PPP markets and GDP in 25 EU countries in billions.



Source: European Investment Bank, Eurostat Database

Table 6: Division of PPP investments according to regions (from 1993 to 2017)

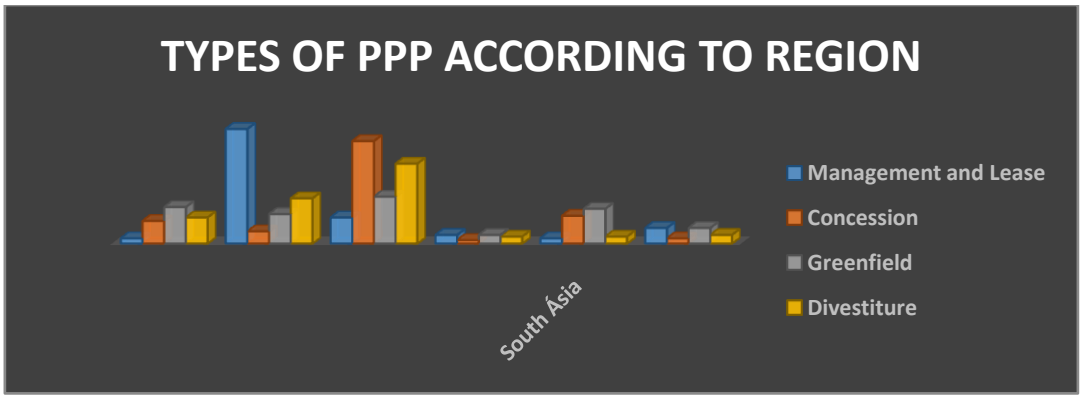
Region	(USD millions)
E. Asia and Pacific	465,679.40
Europe and Central Asia	436,065.10
Latin America	941,943.87
Middle East and North	116,575.87
South Asia	412,121.33
Sub-Saharan Africa	174,561.01
Total	**2,546,946.57**



Source:(WorldBank, 2017)

When classifying the PPP investments around the world between 1993 and 2017 according to regions, Latin America holds the first place totaling USD 941,943.87 million in PPP investments, second come Eastern Asia and Pacific region (USD 465,679.4 million), Europe and Central Asia (USD 436,065.10 million) and South Asia (USD 412,121.33 million) and lastly Sub-Saharan Africa (USD 174,561.01 million) and Middle East and North Africa (USD 116,575.87 million) (WorldBank, 2017).

Figure 3: Types of PPP according to regions.

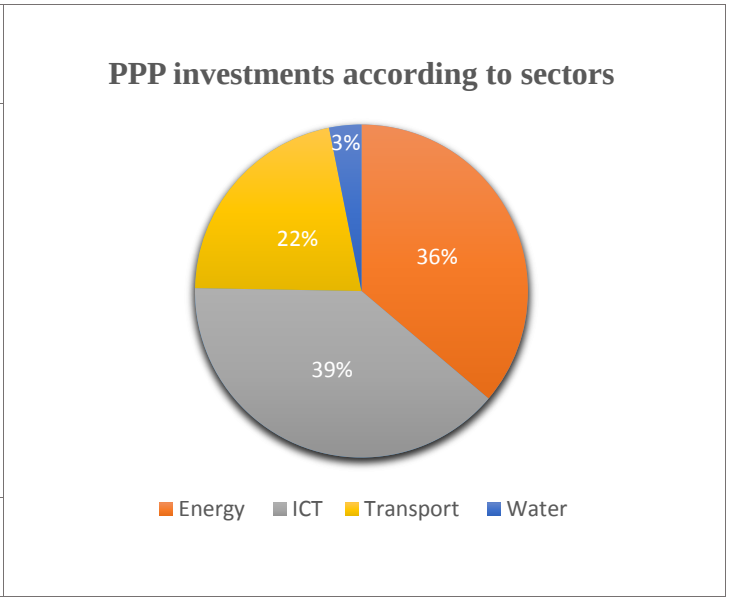


When considering types of projects, Greenfield takes the most significant share totaling to USD 1,536,884.381 m. in investments; Divestiture is regarded as the second most invested type of partnerships totaling to USD 158,300.67 m followed by Brownfield of USD 481,982.47 m and Management and Lease contracts of USD 9779.04 m.

PPPs are diverse, from construction of buildings, tunnels (Hodge & Greve, 2005)expansion of ports (Van Ham & Koppenjan, 2001), sports stadiums (Greve, 2003), wastewater management systems (Johnson & Walzer, 2000), construction and operation of prisons, education (Levin, 1999), and transportation (Klijn & Teisman, 2001), to social policy arenas as human services, welfare service provision (Romzek & Johnston, 2002)and emergency services (Hodge & Greve, 2007).

Table 7: Distribution of PPPs by Sector

Sector	(USD millions)
Energy	922,141.17
ICT	996,837.10
Transport	550,501.70
Water	79,634.25
Total	**2,549,114.17**



Source:(WorldBank, 2017)

Many infrastructure sectors can be considered under PPP agreements among them United States applies PPP on transportation, water, wastewater, schools, prisons, and defense. Each infrastructure sector can differ from the other hence PPP guidelines, procedures and political strategies must be customized for each project.

It is apparent from table 7 that private participation in infrastructure has been concentrated in the information and communication technology sector, which accounts for 39.11% of the total investments from 1990-2017. The second most invested in the sectors is the energy, totaling to 36.17, which involves electricity, natural gas. Transportation sector comes on the third rank concerning investments, occupying a 21.6% of the total expenditures. While water is the most limited sector totaling 3.12% (WorldBank, 2017) which shows that some industries have technical difficulties in partnering in this sector.

1.5. PPP Success Stories Around the Globe

Throughout the world, many countries have witnessed Successful PPP projects following are some examples.

Table 8: PPP success stories in different countries.

Project	Details
Manila Water Company (MWC) 1997, Philippines	- The project to expand the water and wastewater systems in Manila. - Reduced water loss and expanded service delivery across the country.
Thames Water plc, UK	- The company transferred its experience to the public entity and helped in the expansion of the services.
The Route 68 Concession, Chile	- The private company was able to improve the services provided to the customers and receive revenues from the toll users.
Pulkovo International Airport, Russia	- The partnership was able to expand, increase operation quality and handle the increasing passenger and cargo traffic.
Athens International Airport (AIA), Greece	- The project succeeded in constructing a new airport equipped enough to absorb the operational and traffic risks.
Freedom Hospital and Royal Victorian Infirmary, UK	- This is an example of a successful Private Finance Initiative (PFI) and innovative project for the public sector. - The project focuses on renovating a small part of the facilities and construct new ones.
Tanzania Electric Supply Company (Pty) Ltd., Tanzania	- The project focused on operational and financial excellence. - Enhanced operational and economic structures and returned to be a public utility.
Aguas De	- The project was able to overcome service inefficiency, political

Cartagena (AGUACAR), Colombia	intervention, poor delivery, and inefficient resource and financial management that was taking place during the public sector operating period. - Water supply coverage was increased by 74 percent and sewer coverage by 79 percent.
The Southern African Regional Gas Project, South Africa	- The Southern African Regional Gas Project was complex in nature, including diverse companies and was one of the successful in its kind in increasing the country's standards to a higher level and proving the positive aspect of world banks involvement, especially in partial risk guarantees provided by IBRD and cooperation of MIGA guarantee and equity support IFC.
The New Metro Line 4, 2006, Brazil	- The project was sponsored through equity contributors and partial debts from IADB and commercial banks, and the revenue was through direct passenger bills, and revenue guarantee and the revenue-sharing threshold was provided for protection of the private company in case of low incomes.
The Skikda Desalination Plant, Algeria	- The project focuses on seawater purification plant to satisfy the needs of the population and petrochemical industries. - A loan from the government owned bank of Algeria, "Banque Nationale d'Algeria (BNA)" was granted to eliminate the risk of the foreign exchange rate.
The Toll Road, Croatia to Slovenia	- The land was provided by the government as well as a construction risk coverage associated with the renovation of existing roads.
The Rs 400-crore Panagarh and Palsit in West Bengal	- The project improved and constructed lanes between Panagarh and Palsit in West Bengal.
The Orlovski Tunnel St. Petersburg city center to it northeast	- The project connects the St. Petersburg city center to it northeast segment, it includes constructing a tunnel in a Greenfield area and financed through equity, commercial funding, and government subsidies, and the revenues are based on performance-based fees.

segment, Russia	
PPP Projects, Ireland	- Incompetent infrastructure was a significant hurdle in front of continuing economic growth, Ireland's economy was facing substantial setbacks before PPP investments, and after the 90s PPP projects the economic activity increased sharply transforming the country into the fastest growing economy among OECD countries, raising its GDP 40% between 1994 to 1998.

Source:(Delmon, 2010)

1.6. PPP Failure Examples around the Globe

Although many countries witness successes in PPP arrangements, some countries had failures and disappointments, below are some examples:

Table 9: PPP failure/Cancellation examples in different countries.

Project	Details
Hangzhou Bay Bridge, China	- The Bridge was one of the longest trans-sea bridges, connecting many cities. - The project started failing after the divestment of the private sector and acquirement of the public sector the majority of the shares in 2005(Wang, 2016).
Chennai's Solid Waste Management, India	- A PPP project to treat solid waste in India. - High costs resulted from feasibility studies. - Retendering of contract and lack of transition process. - Lack of effective PPP legislation lead to the failure of the project (Mahalingam, 2008).
Road Concession Program, Mexico	- A concession to double the road networks in Mexico. - Revenues were 30% below the forecasted, and 25% cost overruns were witnessed. - The program resulted in massive government bail-out. - Poor legal framework, institutional capacity and lack of economic

	and financial analysis(Ruster, 1997).
Skye Bridge in Scotland	- To connect the Isle of Skye to the island of Eilean Bàn. - High costs accompanied with high tolls, leading to mass protests(Zhang, Xueqing & Soomro, 2004).
Trakia Motor-way, Croatia	- The Project entailed the financing, design, construction, and operation of the 145km long road network. - Lack of transparency in awarding projects which resulted in public protests(Zhang, Xueqing & Soomro, 2004).
London Underground, UK	- Cost overruns of around 20% accompanied a worsening working relationship between the public and private sectors. - Completed six years later than the forecasted date. - Lack of transparency and accurate information, and the weak powers accorded to the Arbiter. - Supply chain plan failure and weak risk allocation between the subcontractor and the investor. - Poor corporate governance and subcontracting(Shaoul, 2002).
Denmark's Farum PPP case	- Farum sold public water treatment plants and other facilities to private businesses and then rented them back. - Expulsion of the mayor and increase of taxes on the citizens by 3.2% to cover the loss (Greve, 2003).
The Utrecht Central Station (UCP) Project	- The project involved a restructuring of the area around the central station as part of city renovation, through improving the infrastructure of the city for cars and bicycles and construction of new public squares. - Cooperation between the municipality and the private sector failed, which lead to blocking and opposing each other. - Created delays and unforeseen costs. (Klijn & Teisman, 2003)

The Awali-Beirut Project (ABP), Lebanon	- Was proposed to alleviate the water shortages in the country. - First introduced in 1952 and feasibility studies conducted in 1972-1984, the civil war and political instability disrupted the process. - The project proposal was revitalized after the war in the form of BOT which hasn't actualized yet, due to government ineffectiveness, but might hold future promises. (Yamout & Jamali, 2006)
Don Muang Tollway's Concession Agreement, Thailand	- Operation revenue was very low compared to the forecasts in the feasibility studies conducted. - Cash flow difficulties were witnessed at the middle stages of the project - Change in laws was another hurdle imposed on the private investor. - Political intervention during the concession

CHAPTER 2: THE PERFORMANCE OF PPPS: A LITERATURE REVIEW

2.1. Infrastructure and Economic Growth

Infrastructure is one of the main building blocks in achieving economic development. Developed countries allocate 4% of their national output and 40-60% of their public venture on infrastructure investments (Merna & Njiru, 2002). Public capital is insufficient when it comes to developing an infrastructure of the countries; hence more and more countries are relying on private investments and designing rules and regulations to control the process (Benković & Milosavljević, 2010).Some countries have witnessed development in the economy after developing components of the infrastructure as transportation, energy, water and telecommunication, India is an example of such countries, who have witnessed a balanced development in its economy.

PPP projects are necessary for the development of infrastructure in countries seeking development and economic progress (Benković & Milosavljević, 2010). In 2009, to overcome the financial and economic crisis, the European Commission issued a "European Recovery Programme" highlighting structural change through private and public partnerships.According to the EU "…investment in infrastructure projects is an important means to maintain economic activity..." (CEC, 2009) In cohesion with "Europe 2020" for "smart, sustainable and inclusive growth" strategy, where both private and public finance mechanism will be employed to finance necessary investments together with PPPs (CEC, 2010). The European Commission has seen in PPP a way towards sustainable growth and together with the European Investment Bank (EIB, 2010) are seeking ways to increase PPP project (Kappeler & Nemoz, 2010), provide guidance and improve public management to ensure better results in PPP projects (EPEC, 2010), The EU sees in PPPs a way to enable

large projects, overcome the problem of EU budget concentration and reach economic and social objectives especially in times of crisis.

A link between infrastructure and economic growth is seen considering capital and labor components,Straub Presented a linkage between infrastructure and economic growth after evaluating the literature on the topic (Straub, 2008).Different sectors have seen different ranges of economic returns on investments, for telecommunication and electricity sectors around 30-40% and for roads 80%, resulting in higher yields in low income compared to middle-income countries (Estache A. , 2006)

After examining the elasticity of GDP to the quantity of infrastructure, a positive elasticity of 0.08 was recorded, showing that a 100% increase in infrastructure will increase the GDP by 80% per year (Calderón, Moral-Benito, & Servén, 2011).

Calderón and Servén emphasized the effect of quality and quantity of infrastructure on economic growth, referring to the impact of the low quantity in infrastructure on Sub-Saharan Africa in effecting the increase in economic growth (Calderón & Servén, 2010). The level of development of the country should be considered when measuring the effect of infrastructure on economic growth (Estache & Garsous, 2012). Infrastructure is deemed to be vital in less developed countries as Garsous states: “the less developed the country, the more likely infrastructure to matter..." (Garsous, 2012).

According to Estache and Garsous, all the infrastructure sectors in a country are vital to sustain growth and improve a state to increase its growth rate and compete with other countries (Estache & Garsous, 2012). Energy, especially power generation and telecommunication are seen to have a more significant positive economic impact on a country (Égert, Tomasz, & Douglas, 2009).

Infrastructure is seen to affect the development by reducing poverty, inequality and positively affecting growth, job markets, health and education of a country(Straub, 2008)(Calderón & Servén, 2010).

The studies on low income developing countries are minimal regarding the need for public investment and infrastructural projects and their effect on growth. Since all the factors of production are linked together, robust public infrastructure will positively affect other factors of production and lead to an increase in their productivity and decrease costs (Moreno-Dodson & Agénor, 2006).

2.2. Developing Countries and Infrastructure

To elevate poverty levels, improve standards of living and induce growth in low- income developing countries international society initiated action steps to encourage investments in public entities, especially infrastructure. United Nations Millennium project (2005), United Sustainable Development Goals (2015) and the World Bank (2005) promote investments in public facilities as a way of development aid (Moreno-Dodson & Agénor, 2006)

According to a World Bank statement "Over 1.3 billion people—almost 20 percent of the world's population—still, have no access to electricity. About 768 million people worldwide lack access to clean water, and 2.5 billion do not have adequate sanitation; 2.8 billion people still cook their food with solid fuels (such as wood), and one billion people live more than two kilometers from an all-weather road." (WorldBank, 2016)

Infrastructure is believed to affect the economic growth of a country(Moreno-Dodson & Agénor, 2006). The developing countries have an inferior infrastructure, limited access to

transport, telecommunication, electricity and water and have low levels of public spending to improve the latter although official Development Assistance (ODA) seeks to finance public projects in these countries but is not able to overcome the infrastructure absence in the least developed areas which lead to the need for PPPs.

According to Estache the middle class of the developing countries that rely on publicly provided utilities isaffected the most from PPP projects and not the extremely poor section of the population. The latter reality use other sources of energy and water and wouldn't be affected by a PPP in infrastructure while others argue that the Private sector involvement might also result in the inclusion of the impoverished section of the population (Estache A. , 2006).

When investing in public infrastructure, population needs should be considered instead of political calculations. All the areas should be included in the partnership projects and not only politically visible regions. Demand-driven infrastructure undertakings must be considered to improve the quality of life for the low-income poor countries.

2.3. PPPs and Sustainable Development Goals in Developing Countries

United Nations in 2015 adopted sustainable development as a tool for the world transformation and stated that "The new agenda is people-centered, universal, transformative and integrated. It calls for action by all countries for all people over the next 15 years in five areas of critical importance: people, planet, prosperity, peace, and partnership(UN, 2015) The agenda is based on 17 sustainable development goals (SDGs) which focus on transforming the world and improving developing countries through innovation and partnerships.

The 17th goal "Strengthen the means of implementation and revitalize the global partnership for sustainable development" focuses on partnerships between civil society,

governments, and international partners to achieve the economic development. The international community encourages the use of PPPs to achieve sustainable development and has created a platform known as the Global Infrastructure Facility (GIF) to join different stakeholders for the financing and execution of infrastructure projects. "The GIF platform coordinates and integrates the efforts of Multilateral Development Banks (MDBs), private sector investors and financiers, and governments interested in infrastructure investment in Emerging Markets and Developing Economies – fostering collaboration and collective action on complex projects that no single institution could achieve alone." (WorldBank, 2015).

In order to achieve agenda 2030 the international community including United Nation (UN) agencies, World Bank (WB), European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), Global Investment Facility (GIF) and others join to shift the focus of the private business sector from developed to developing countries, offering them with guarantees to overcome political and institutional risks. PPP infrastructure projects should be selected according to the social implication of the project and the number of people it is affecting (Zapatrina, 2016).

SDGs can only be achieved through "modern, environment-friendly, energy efficient and smart infrastructure" (Zapatrina, 2016). In developing countries, infrastructure projects are vital for improving the quality of life, economic growth, and achievement of SDGs, but it is essential to note that returns on the investments are very low, since the population is unable to pay large amounts of money for the service, making it unattractive for the private investor (Zapatrina, 2016), here comes the role of international financial Institutions (IFI)s to provide guarantees in unstable developing areas which are most in need of PPP infrastructure projects.

PPPs create job opportunities, result in innovative solutions and technological advancement. peace and stability are key components to enable the implementation of 2030 agenda, PPPs could serve to achieve some of the targets mentioned by UN regarding its 2030 goals (UN, 2015) and result in reduction in government corruption, transparency and enhanced institutional quality (Zapatrina, 2016) in developing countries.

The direction more and more is growing towards the partnership models mostly due to increased budget deficits and deteriorating public debts in most countries, aiming to reduce the government burdens and improve the quality of services. Also, given the significant impact of infrastructure on economic growth through enhanced productivity and increased competitiveness, international institutions encourage the use of PPP and see it as a socio-economic development tool.

In some instances, PPPs are inflated in value by international agencies (UN, Report of the International Conference on Financing for Development, 2002) especially in the constitution of the New Partnership for African Development (NEPAD, 2001). In some developing countries, governments tried to make structural reforms through privatization of infrastructure, taking examples of developing countries as India, Vietnam and Bangladesh a 20 to 30% increase in income after electrification of the area was considered. It was found a 60-70% increase in revenue related to non-farming activities.

2.4. Theoretical Framework

The role of investment as a primary driver of growth has been the focus of many theoretical contributions, where the discussion was mainly around the nature of the returns of investment. On the other hand, crippling budget deficits are the reason behind the inability of governments to invest in infrastructure, a main driver of development. In what

follows, growth theories combined to public management theories constitute the anchor of the proposed model.

Other theories in New institutional economics and innovative economics could also be considered in studying PPPs.

2.4.1 Growth Theories

When discussing the contribution of PPP investments to GDP, I have based my model on the growth theories of Robert Solow, Robert Lucas, Douglas North, and Paul Romer.

Solow in his growth theory considered labor, capital and knowledge as the main components of economic growth, his model considered the diminishing returns to capital, and labor adding the technological knowledge factor which was a factor happening outside the economy and aiding in capital accumulation and labor force improvements.

Later, an endogenous model was suggested by Lucas, arguing that human capital, innovation, and investment capital are internal factors affecting economic growth. According to this theory, population growth, accumulation of human capital and knowledge are the determinants of economic growth. He emphasized the creation of human capital and focused on the increasing returns associated with knowledge which has many allegations for economic development policy and create sustainable growth.

Then, economists North and Romer, emphasized the central role of institutions in driving economic progress. According to their endogenous growth theory, the adaptable efficiency of institutions to the changing economic situation over time in response to changes in circumstances, and development of new rules and practices to guide transactions shapes the ability of economies to continue the progress. Considering that institutions are evolved human structures, having political, economic and social backgrounds, set laws, guidelines

and instruments of exchange have to be adequately developed to ensure proper control, political stability and lead to economic growth. The theory of institutional change has become essential in social sciences particularly economics.

2.4.2. New Public Management

Misrepresented governmental interferences and bureaucratic government structures are the main reasons for inefficiencies in public institutions, leading to the development of New Public Management under Margaret Thatcher in 1980s in the United Kingdom and later in other countries. This new school of thought aims to introduce the principles of private firms in public management, modernize the state and reorganize the structure of public institutions. As a result of this new management system, PPPs gained popularity in financing and managing infrastructure projects, which was believed to reduce the inefficiency of the public institutions and prepare them for market competition (Hammami, Ruhasgyankiko, & Yehoue, 2006).

New Public Management relies on traditional economic principles of competition, which focus on providing the best quality services with reduced costs.

The new public governance is a policy framework that suggests that through PPPs, the third parties provide the services previously provided by the government.(Mauldin, 2012). It represents an essential angle in the PPP arrangements in settling undertakings between the parties and emphasizing on the liaison between their political and social frameworks (Kooiman, 1993) (Kickert, 1997). To protect and control the use of public resources clear policies, laws, and agreements should be set. (hall & Kennedy, 2008)

2.4.3. New institutional Economics and Innovative Economics

Other theories in New Institutional economics and innovative economics could also be considered in PPPs.

New Institutional economics focuses on the role of institutional quality on economic growth it emphasizes on relationships between different entities with diverging interests and includes economic theories of organization, property rights and transaction costs (Kundakchyan & Mokichev, 2014). Transaction cost theory focuses on hybrid organizations as PPPs which are affected by any political and macroeconomic situation that arises.

The theory of innovation on the other hand, which was initially developed by Schumpeter and later used in the OECD program focuses on efficiency and competitive advantage as a result of innovations and research leading to socioeconomic growth. PPPs employ the innovative mentality of the private sector in the public institutions(Kundakchyan & Mokichev, 2014).

PPPs are hybrid agreements, where the public sector puts its trusts through a contract in the private entity to ensure proper construction and management of public infrastructure, efficient delivery of the services and maximization of returns and optimization of costs. While private sector transfers knowledge and innovative skills to the public sector employees especially in areas of information technology and management, it is known that this cooperation can't overweight competition in the market regarding benefits but may help the participants to obtain "collaborative advantage" gaining a competitive advantage over their competitors (Farrer, Kee, Newcomer, & Boyer, 2010).

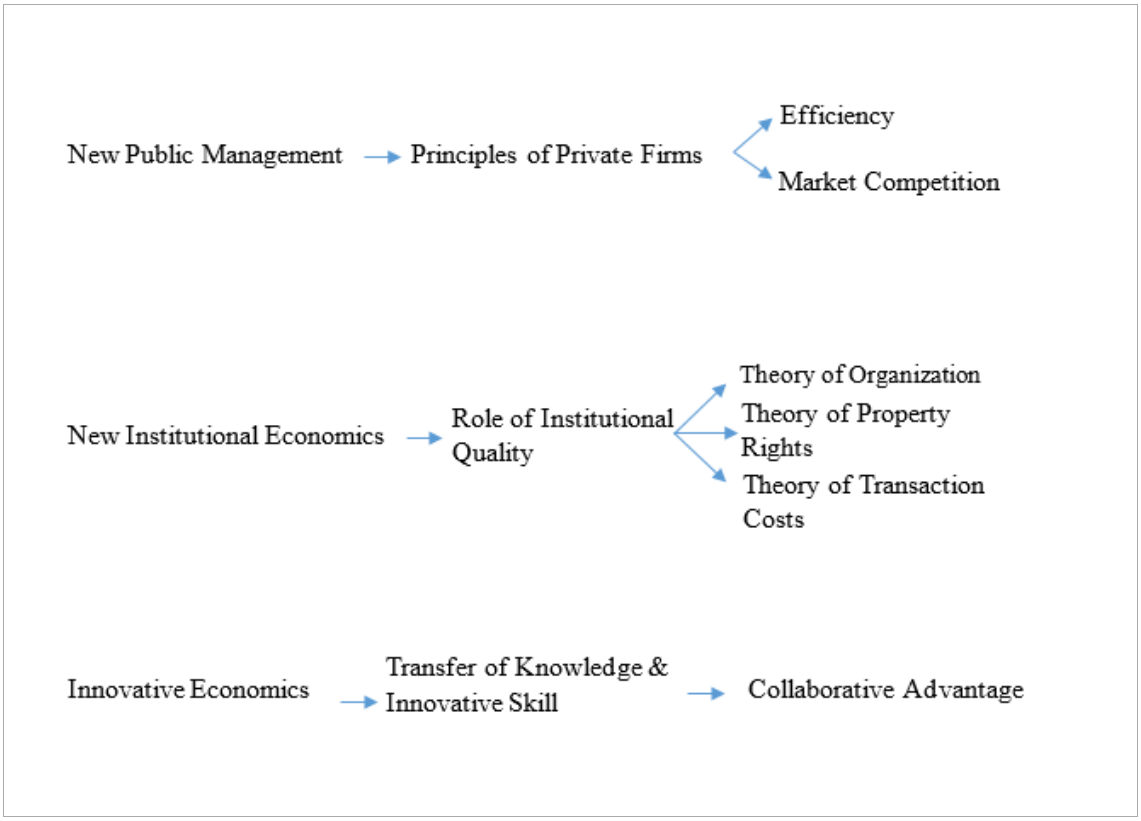
2.4.4. Summary of the Theoretical Framework

Table 10: Summary of the Theoretical Framework

Authors	Schools and Theories	Main Points
Robert Solow	Exogenous Growth Theory	- Labor, capital and knowledge are the main components of economic growth.
Robert Lucas	Endogenous Growth Theory	- Human capital, innovation, and investment capital are internal factors affecting economic growth.
Douglas North and Paul Romer	Institutional Growth Theory	- The central role of institutions that in driving economic progress. - Development of new rules and practices to guide transactions shapes the ability of economies to continue the progress.
(Hammami, Ruhasgyankiko, & Yehoue, 2006).	New Public Management	- Margaret Thatcher UK, the 1980s - The principles of private firms in public management. - Modernize the state and reorganize the structure of public institutions.
(Mauldin, 2012)	New Public Governance	- Third parties, provide the services previously provided by the government.
(Kooiman, 1993) (Kickert, 1997)	New Public Governance	- Liaises between political and social frameworks of private and public partners.
(hall & Kennedy, 2008)	New Public Governance	- Clear policies, laws and agreements are vital for the protection of public resources,
(Kundakchyan & Mokichev,	New Institutional Economics	- Effect of institutional quality on economic growth.

2014)		- Emphasized relationships between different entities with diverging interests.
(Williamson 1985,1989,1996)	Transaction Cost Theory	- Hybrid organizations as PPPs. - Incomplete contracts influence of political and macroeconomic situation.
(Kundakchyan & Mokichev, 2014)	Theory of Innovation	- Strives efficiency and competitive advantage through innovations and research. - Lead to socioeconomic growth.
(Farrer, Kee, Newcomer, & Boyer, 2010)	Maximization of Returns	- Efficient delivery of the services and maximization of returns and optimization of costs. - Private sector transfers knowledge and innovative skills to the public sector employees.

Figure 4: Graphical representation of theoretical framework



2.5. Impact of PPP Investments in Infrastructure

2.5.1. Investment in PPPs

Favorable political, legal, economic and commercial settings are necessary for a PPP platform to be successful. Governments can encourage private sector participation by creating political stability, abolishing nationalization, and carrying some of the risks including a change in the law, foreign currency rates, corruption, suspension of licenses and force majeure risks (Fitzgerald, 2004).

The Competition will drive the prices downwards and stimulates innovation in public private partnership projects. (NAO, 2007)

Past experience in PPPs is a major indicator of the success for investors and affects the government's reputation and presents incentives for new investments (Hammami, Ruhasgyankiko, & Yehoue, 2006).

Current investments in PPPs could determine the success of the future PPP ventures. Both positive and negative experiences have their implications on future partnerships. Positive experiences enhance the readiness of both the government and the private sector to invest more and on a larger scale in future PPP projects. While, negative experiences resulting from the governments end, could affect the status of the government in terms of partnership and limit the inclination of the private partner to invest in the public facilities, negative experiences from the private sectors end, could reflect the private sectors readiness to invest and manage a project on a timely manner and hence encourage the government to allow more partnerships (Siemiatycki, 2011).

It is well known that governments when faced with economic and financial crisis, rethink about their strategies and shift to establishing partnerships which might be the worst time for them to negotiate, given their weak position. Fiscal pressures urge governments to look for innovative solutions, for reallocating resources and improving public sector efficiency.

Macroeconomic stability of a country is a requirement for a successful PPP. Private investors are drawn towards countries that have promising macroeconomic structures and present a safe environment for the private partner to invest its money and expect returns for on his investment. Deprived macroeconomic circumstances delay or eliminate the attempts of investment through the PPP model, repealing the investor's efforts to invest in public facilities and infrastructure projects(Patricia & Francesca, 2009).

2.5.2. Other Investments

Market conditions are vital for any investments. Sound market conditions will encourage the investors to heavily invest in public facilities having in mind the relatively high return on their investments and open a way to market-induced competition (Michael, Jim, & Peter, 2011).

While capital market uncertainty will increase the risk and largely affect the infrastructure sector and hinder the readiness of the private investor and limit their enthusiasm to invest. (Michael, Jim, & Peter, 2011).

Many studies have reported the effect of developed infrastructure on economic growth, World Bank through its surveys has highlighted the opportunity cost of lack of investments regarding productivity and growth in developing countries. The elasticity of GDP relative to quantity and the quality of infrastructure has been used to estimate the opportunity costs, concluding that improved infrastructure will reduce the poverty line and hence contribute to economic growth. Other studies also highlighted the relationship between infrastructure and economic growth, mentioning that an economic loss of 1 to 3% is seen in counties with poor infrastructure (Baker N. B., 2016).

2.5.3. Labor Force Participation

Regarding job creation and growth, infrastructure was seen to have an enormous effect (Estache A. , Ianchovichina, Bacon, & Salamon, 2013). After researching different regions, it was concluded that employment was elastic to infrastructure investment (Estache & Garsous, 2012), indicating that infrastructure creates many jobs especially in labor concentrated sectors like construction, through new building and maintenance activities which affect economic growth and in turn, creates more jobs in the market

(Schwartz, Andres, & Georgeta, 2009). South Africa witnessed a 9% increase in the employment rate of women in rural areas after the electrification project. (Jiancai & Yu, 2012).

Table 11: **Employment elasticities to infrastructure across regions (2004-2008)**

Central & S.-East. Europe(non-EU)	0.2
East-Asia	0.1
South-East Asia & the Pacific	0.4
South Asia	0.3
Latin America & the Carribbean	0.5
Middle East	0.7
North Africa	0.7
Sub-Saharan Africa	0.5

Source: International Labor Office (KILM)

Different authors see contradictory conclusions, Gassner considers a decline in employment numbers in water and electricity divestiture projects an increase in productivity of the remaining labor in developing countries (Gassner, Alexander, & Nataliya, 2009). Estache and Garsous on the other hand, concluded an increase in employment levels and productivity as a result of private participation in the Mexican port reform project while both agree (Estache & Garsous, 2012) that PPPs in telecommunication sector to create more qualified jobs and increase in employment as a result of ICT change.

Improved infrastructure has a positive effect on labor productivity providing public services to citizens as transportation to their jobs, electricity to perform their duties and easy ways of communication through improved telecommunication sector, which will enhance the quality of work and productivity-reducing stress. (Agenor & Neanidis, 2006)

Considering forecast investment needs of MENA region from 2010-2020, Estache, et al (2013) concluded that if the estimated requirement of investment is in reality invested will create 2.5 million jobs yearly (Estache A. , Ianchovichina, Bacon, & Salamon, 2013).

Gassner sees in PPPs a way to improve labor productivity. In Latin American countries, considering telecoms, electricity and water sectors, and public private partnership projects have been proven to increase the investment, labor productivity and quality while decreasing unemployment levels (Gassner, Popov, & Pushak, 2007). According to Megginson, privatization results in labor force growth, since private companies have expansion strategies to improve their efficiency. They also tend to improve the investment and profitability of the facility (Megginson, Nash, & Van Randenborgh, 1994).

Many experts focused on the effect of infrastructure on inequality reduction, according to them intensification of infrastructure drops inequality levels, enabling the poor to access the facilities and hence obtain more services they further conclude that quality and quantity of infrastructure suggestively reduce inequality(Calderón & Servén, 2010).

When infrastructure is developed, restrictions as damaged roads, electricity, water and communication shortages are removed, resulting in higher investments especially in rural areas where most of the economic activity would be restricted. Considering the case of China where infrastructure development in rural areas where agricultural activities were undertaken facilitated labor movement and capital and growth of trade and service sectors.

Considering the energy sector electrification of households is seen to have a positive impact on economic welfare, a positive influence of energy infrastructure on female employment rates especially in developing regions in South Africa was seen.

Developed infrastructure increases productivity and growth, which in turn increase the consumption and private investment and hence, increases revenues from indirect taxes. (Estache A. , 2006).

Some economists argue that PPPs yielded positive outcomes in service coverage and resulted in an increase in the welfare of the poor population in Bolivia, Nicaragua Argentina and Mexico. Others see an increase in the welfare of the poor through PPP projects which reduced the prices and made the service accessible to more people. (Estache A. , Ianchovichina, Bacon, & Salamon, 2013)

2.5.5. Human Capital

Infrastructure services as energy (electricity, etc.), transportation (roads, railways, airports, and ports), ICT (telecommunication, information services, etc.) and water (water sanitation, clean water and waste reduction) ease the ability of the individual to live in a healthy way and acquire relevant education and skills (Brenneman & Kerf, 2002).

There are direct and indirect components that enable the infrastructure to affect economic growth, among which health and education are seen as one of the most critical factors(Moreno-Dodson & Agénor, 2006)

Human capital is necessary for economic growth, without adequate infrastructure like clean water, sanitation, waste disposal, electricity and telecommunication, human capital can't provide proper services. Thus, by improving the productivity of human capital through health and education, indirectly will contribute to economic growth(Moreno-Dodson & Agénor, 2006)**.**

When considering the electrification effects on education, India and Bangladesh witnessed a conclusion of a 10-11% increase in school admission and grade completion due to more study time. And when considering the direct impact of infrastructure and education (Brenneman & Kerf, 2002) having better transportation, safe water, electricity, and access to information technology enables better performance at school and ensures continuous education, especially in rural areas in low-income developing countries, where necessary infrastructure is unavailable, resulting in limited roads and difficulty to get to educational institutions, hence high dropout rates and inequality in men and women education levels. Developed technology infrastructure in the education field can result in developed human capital, hence sustainable growth.

To improve health services in a country and improve economic growth, an investment in infrastructure is a base for improved health technology, which will improve health services and hence result in the growth of the sector.

Improved water services and providing fresh non-contaminated water will affect the health of the citizens (Brenneman & Kerf, 2002). In low-income developing regions such as Africa, the death rates dues to contaminated water are very high compared to countries which have good water and water sanitation services. Countries with developed water and water sanitation infrastructure have marked decrease infant mortality rates. (Newman & al., 2002) There are sustainable health benefits in areas with proper water and water sanitation services, reducing common diseases and diarrhea especially among children. Concerning this sector, a 24% decrease was found in childhood diseases in India and a 36 % reduction in diarrhea under age 5 in Nepal. A 6 % reduction in child mortality rates in Peru due to proper water supply and sanitation was also recorded. While considering

Brazil, a drop of 8-13% in the following diseases lumbricoides, T. trichuria, and duodenalis was considered (Wagstaff & Claeson, 2004).

The energy sector has its implication on health, electricity is vital for the survival of citizens, from hospitals to households. This sector proves to be one of the essential components of infrastructure in ensuring standards of living and quality of life. Clean energy proves to be a necessity under the current environmental constraints, building a robust energy infrastructure will boost the use of clean energy and aim to reduce pollution and illnesses.

Health can lead to the development of valuable human capital with skills and can have a substantial effect on growth. However, good infrastructure will lead to a healthier life. In most instances, health and education are not considered when measuring the impact of infrastructure on growth and can lead to underestimation of the values.

2.6. The Impact of Institutional Quality on PPP Investments

Governments see private investments as a way for infrastructure growth, service quality enhancement, and increased operation efficiency without increasing governmental debt, on the contrary, adding on its revenue, as for the private sector, it opens new horizons to operate which was limited before PPPs. Corruption and political risk hinder the success of the projects, and the government should gain private sector's trust through clear channels of responsibility and accountability for its involvement. Sound and transparent regulatory system guarantee the private partner's protection from exploitation and risk (Pongsiri, 2002) ensuring the public partner's operation efficiency (Zouggari, 2003).

Structural, institutional and contractual issues have risen in PPP arrangements known by DiMaggio and Powell as the "institutional Paradigm" (DiMaggio & Powell, 1988).The

institutional environment has a significant impact on trust between the parties involved in PPP contracts (Osborne, 2000). Indeed, opportunistic behavior increases transaction costs and threatens the efficiency of PPPs.

The World Bank classified the institutional quality according to 6 indicators including:

2.6.1. Political Stability

J. Delmon observes implementation of PPP as a pure political decision by the government, taking into consideration social and political allegations (Delmon, 2010), adding on it institutional, legal and regulatory framework and availability of skills and resources in the government and preparedness of the financial and commercial markets and their motivation to take part in it. (Jones, 2002)

Political risks arise from a change in the political structure of the country. Government participants, as well as other things as cost, source of finance and arrangements, need to be considered when scheming the best PPP structures.

PPPs were seen from the start as a way to weaken the political control on the decision making in the public sector. Trade unions consider PPPs as an enemy, who diminishes job vacancies and worsens working conditions, while citizens are concerned about the profit motive of those service providers (Osborne, 2000).

2.6.2. Control of Corruption

Corruption and political risk hinder the success of the projects, and the government should gain private sector's trust through clear channels of responsibility and accountability for its involvement.

For PPP programs to succeed in a given country, political commitment and good governance are essential. Corruption and political risk hinder the success of the projects and suitable laws a reliable legal framework is needed to track the operations (Osborne, 2000).

2.6.3. Regulatory Quality

One of the leading frameworks for the success of PPP is a transparent regulatory system which guarantees the private partner's protection from exploitation and risk (Pongsiri, 2002) ensuring the public partner's operation efficiency. (Di Lodovico, 1998) (Zouggari, 2003) According to (Baker R. , 2003) regulatory systems and control is vital for the success of PPP arrangements and demand more controlling relationship between the private and public entities.

Clear regulations should be set to ease competition and incentives for investments and solve the problem of costly renegotiation. Governments should provide political assurance, upright control, and clear laws and enhance its project assessment and prioritization to achieve successful PPP models.

Therefore, Competent, independent and legitimate rules and regulations are a basis for monitoring and protecting partnerships and determining long term success of PPP projects in particular in developing countries which are faced with high financial and structural risks.

2.6.4. Government Effectiveness

Improved government effectiveness is seen as a tool towards achieving sustainable development goals, governments through their effective approaches provide the necessary services to its citizens.

According to Burke government effectiveness has a significant impact on different sectors of the economy, emphasizing more on the electricity sector in developing countries, he added that skills as identifying, planning, committing and prioritizing were the keys for an effective electricity system for the citizens.

Countries with higher "government effectiveness" status attract more donations from the international community. for example, Kenya ranking highest among the Sub-Saharan African countries regarding government effectiveness, has received support from African Development Bank in 2015 for the Last Mile Connectivity project. (Best & Burke, 2017)

2.6.5. Voice and Accountability

Voice and accountability is an essential dimensions of governance. They present the nature of the relationship between the state and the citizen. Voice of the citizens, their satisfaction is an encouragement for the betterment of the services provided by the state.

While accountability is the responsiveness of the government for the needs of its citizens, some experts consider PPP a way to solve the problem of management in governmental institutions aiding in transparency and accountability and creating collaboration in the decision-making process (Salamon, 1995). Another reason for employment of PPPs is the rising interest in e-government, which has urged public institutions who lack experience in new technologies to seek private company's knowledge and investment programs in ICT sector (Langford & Harrison, 2001).

2.6.6. Rule of Law

As part of the regulatory framework, international accounting and reporting standards are needed for PPP projects, to ensure transparency and proper assessment of fiscal costs.

Effective regulations are required for reliable contracts from the beginning to avoid costs and risks (ADB, 1997), but over-regulations can load and disrupt PPP arrangements (Walker & Smith, 1995).

On a legal perspective, some countries as UK, USA, France, Italy, Netherlands and many more have included PPP in their legislation. United Nations and European Union have also adopted private-public partnerships and consider it as an essential component for social welfare (Jones, 2002) and socio-economic development (Khan, 2005)

CHAPTER 3: EMPIRICAL ANALYSIS

As suggested in the previous literature review, the impact of PPP infrastructure investments on the GDP of the developing countries will be tested as per the following hypothesis:

3.1. Hypothesis

3.1.1. Investment in PPPs

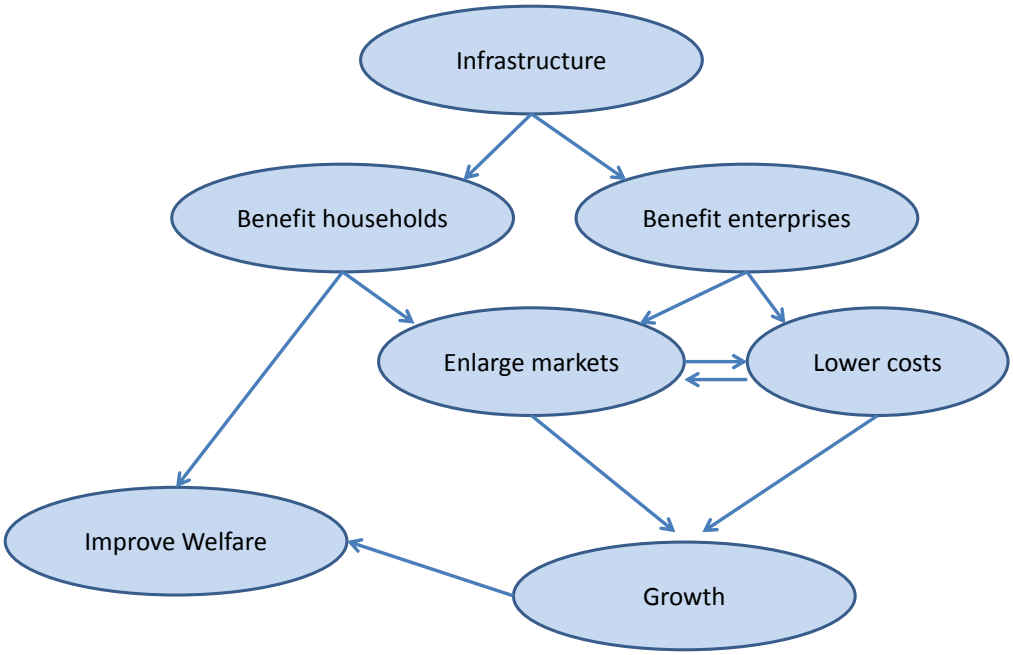
Referring to the previous literature, many researchers emphasized the importance of public infrastructure on the overall welfare of a country. Although there were varying results in empirical studies of different countries, yet many of them were able to find a link between effective infrastructure and improved economic growth. The World Bank found a positive relationship between infrastructure, labor productivity and economic growth in developing countries, and saw in it a way to raise the living standards and reduce the number of people living below the poverty line in these countries (Estache A. , Ianchovichina, Bacon, & Salamon, 2013).

Infrastructure, through its different components (electricity, water, ICT and transport) contributes to the improvement of the quality of life and the increase of the social welfare of a country as presented by Prud'homme (2005) in figure 5(Prud'homme, 2005).

International organizations as United Nations, Asian development bank (ADB), World Bank (WB) direct the countries towards integrating partnerships in their development agendas. Moreover, United Nations under "Sustainable Development Goals" adopted in 2015, stated the importance of partnerships in socio-economic development (UN, 2015)leading to more PPPs in infrastructure projects.

Foreign Direct Investment (FDI) in public goods was seen to accelerate the economic growth of the host country (Ram & Zhang, 2002). Thus, private national and foreign investments in infrastructure in the form of PPPs contribute to a much needed economic and social development in the developing world.

Figure 5. The contribution of infrastructure to economic development



Source: Prud'homme, 2005.

Source: Prud' homme, 2005

As a result, PPPs became a tool for economic and social development, joining the private sector's innovation, operational excellence and management know how to the government's control on public assets and paving the way for better infrastructure.

Based on the above and preceding discussions in section 2.4.1, the following hypothesis is formulated:

> ***H1: Private investments commitment in public private partnerships in infrastructure positively affect GDP per Capita.***

3.1.2. Other Investments

It is proven that investments are a main driver of economic growth. The United Nations considered data from 1960-1985 and found that for each 1 percent investment in equipment a three percent of GDP increase was recorded per year (De Long & Summers, 1991).

Economists agree that to maintain economic growth over the long run large investments in fixed capital should be considered. Investments are seen as one of the main determinants of economic growth, a sensitivity analysis performed by Levine and Rennet in 1992 found a strong correlation between the two (Blomstrom, Lipsey, & Mario, 1993).

World Bank through its surveys has highlighted the opportunity cost of the lack of investments in infrastructure regarding productivity and growth in developing countries. The quality of infrastructure is a crucial factor in attracting foreign investment in developing countries. Investors begin to induce their money in the economy only after a certain development threshold is reached. Moreover, when comparing quality infrastructure and tax breaks as a motivator for investments, it was found that infrastructure was dominant over tax facilities. (Wheeler & Mody, 1992)

Robust infrastructure is known to enable geographical diversification of industries across the country, energizing different sectors of the economy, especially in rural areas (Wheeler & Mody, 1992). When considering infrastructure-road density, it was found to have a positive effect on investment productivity (Craig, Pardey, & Roseboom, 1997).

Economists and policymakers considered infrastructure as a central component in regional development policies, claiming that it provides conveniences to private investors and improve the productivity of existing resources. Construction of a highway reduces transportation costs by lowering shipment time and vehicle use. It is important to note that

public capital affects the rate of return on private equity hence stimulates more investments(Bronzini & Piselli, 2009).

Based on the above and preceding discussion in section 2.4.2, the following hypotheses are formulated:

H2: Other investments positively affect GDP per Capita.

H3: Investments in PPP affect positively the marginal impact of other investments on GDP per Capita.

3.1.3. Labor Force Participation

Labor is one of the main components of Solow's production function. It has proven to influence the economic growth of a country. Previous literature emphasized the importance of the contribution of labor to the increase in GDP in developing countries and found a positive effect on the growth especially in developing countries.

After conducting research on different regions Estache and Garsous concluded that employment was elastic to infrastructure investment (Estache & Garsous, 2012), indicating that infrastructure creates many jobs specially in labor concentrated sectors like construction, through new building and maintenance activities which affect economic growth and in turn, create more jobs in the market (Schwartz, Andres, & Georgeta, 2009). Based on the preceding discussion and the information presented in the literature review section 1.6.3., the following hypotheses are formulated:

H4: Labor force participation positively affects GDP per Capita.

H5: Private investments commitment in public private partnerships in infrastructure affect positively the marginal impact of labor participation rate on GDP per capita

3.1.4. Human Capital

Human Development Index used to measure the human capital in this paper, represents the education, health and living standards of people. It contributes to growth since it increases the productivity of labor.

When considering the direct impact of infrastructure on education, the literature confirms that having better infrastructure enables better performance at schools and ensures continuous education (Brenneman & Kerf, 2002). Furthermore, a developed infrastructure in technology in the education field can result in developed human capital, hence sustainable growth.

As detailed in the literature review, to improve health services in a country and improve economic growth, an investment in infrastructure is a base for improved health technology,

Infrastructure is also seen to affect the development by reducing poverty, inequality and improving the living conditions of the people(Calderón & Servén, 2010).

Based on all the preceding discussion and section 2.4.5, the following hypotheses are formulated:

> ***H8: Human Development Index positively affect GDP per capita***
>
> ***H9: Private investments commitment in public private partnerships in infrastructure affect positively the marginal impact of Human Development Index on GDP per capita.***

3.1.5. Institutional Quality

Institutional quality encompasses many aspects. We rely on the WGI 6 indicators developed by the World Bank to formulate our next hypotheses. The following WGI

indicators are taken separately in our hypotheses due to correlation (Kaufmann, Kraay, & Mastruzzi, 2011)

1. Political Stability and Absence of Violence/Terrorism

Political stability and absence of violence/Terrorism are measured by the probability that the governments will be undermined by violence, terrorism, and instability. As detailed in the literature review, political instability will hinder the economic activity and affect the attractiveness of investments in a country. Based on the provided information in section2.5.1 regarding this indicator, the following hypotheses are formulated:

H10: Political stability of the country of the investment positively affect GDP per capita.

H11: Political stability affects positively the marginal impact of investments in PPP on GDP per capita.

2. Control of Corruption

Corruption is measured by the amount of power exercised for private gain. Corruption and political risk hinder the success of the projects, and the government should gain private sector's trust through clear channels of responsibility and accountability without any power exertion and control. The below hypothesis are formulated referring to the literature review in the section 2.5.2.

H12: Control of corruption of the country positively affects GDP per capita.

H13: Control of corruption affects positively the marginal impact of investments in PPP on GDP

3. Regulatory Quality

Regulatory quality is measured by the capability of the government to formulate comprehensive policies that drive the private sector development. With a quality regulatory system, governments provide a chance to the private stakeholders to invest vastly and seek profits and stimulate the economy towards growth, the following hypotheses were formulated relying on the literature review in section 2.5.3.

H14: Regulatory quality of the country positively affect GDP per capita.

H15: Regulatory quality affects positively the marginal impact of investments in PPP on GDP per capita.

4. Government Effectiveness

Government effectiveness is measured by the quality of the public services provided by the government to the citizens. Countries with better government effectiveness receive more support as investments from international donors and development banks than the ones who lack stable, effective governments. The following hypotheses are based on the literature review section 2.5.4.

H16: Government effectiveness positively affects GDP per capita.

H17: Government effectiveness affects positively the marginal impact of investments in PPP on GDP per capita.

5. Voice and Accountability

Voice and accountability are measured by active citizenship, freedom of expression and participation and shows the status of the relationship between the government and citizens. The following hypotheses are based on the literature review section 2.5.5.

H18: Voice and accountability positively affects GDP per capita

H19: Voice and accountability affects positively the marginal impact of investments in PPP on GDP.

6. Rule of Law

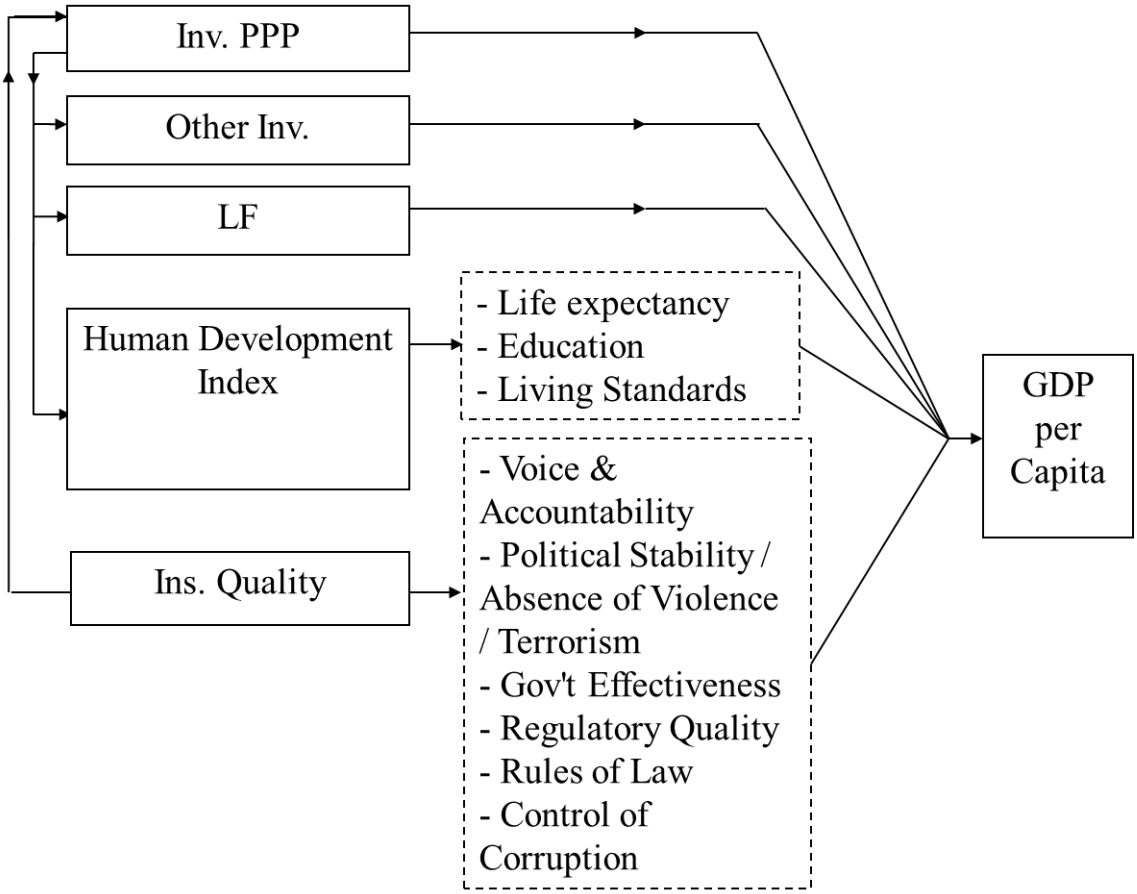
The Rule of law measures the strength of the rules instilled in the society. It includes everything from respecting rules of property rights to crime and courts. The following hypotheses are based on the literature review section 2.5.6.

H20: Rule of law of the country positively affects GDP per capita.

H21: Rule of law affects positively the marginal impact of investments in PPP on GDP per capita.

The following figure (Figure no. 7) illustrates the relationships to be tested in our empirical model.

Figure 6: Drawing a representation of the relationships



3.2. Model: Increase in PPP Investments >> Economic Growth

$$GDP_{it} = \alpha + \beta_1 InvestPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ_{it}$$
$$+(\beta_6 InvestPPP \times K_{it}) + (\beta_7 InvestPPP \times L_{it}) + (\beta_8 InvestPPP \times HDI_{it})$$
$$+ (\beta_9 InvestPPP \times InstitQuality_{it}) + \in_{it}$$

Where:

***i*:** Country

***t*:** Year

***GDP*:** Real GDP per capita (constant 2010)

***IPPP*:** Private investment commitments in millions of USDs.

***K*:** Other investments

***L*:** employment overpopulation ratio.

***HDI*:** Human Development Index

***IQ*:** Institutional quality which includes six indicators according to WGI (world Governance Indicators) taken separately due to correlation. Therefore, the model above is represented in six equations, with institutional quality being measured by one of the following indicators in each one. The index is between -2.5 to 2.5, the higher the score the better is the institutional standing of the country.

- IQ_1: **political stability**
- IQ_2: **control of corruption**
- IQ_3: **regulatory quality**
- IQ_4: **government effectiveness**
- IQ_5: **voice and accountability**
- IQ_6: **rule of law**

Note:

When the coefficient of an interactive term is positive, it increases the impact of the variables that form it on GDP.

Example:

$$GDP_{it} = \alpha + \beta_1 InvestPPP_{it} + \beta_2 K_{it} + \cdots + (\beta_6 InvestPPP \times K_{it}) +_{\dots} + \in_{it}$$

$$\frac{dGDP}{dK} = \beta_2 K_{it} + (\beta_6 InvestPPP \times K_{it})$$

$$\beta_6 > 0 \Rightarrow \frac{dGDP}{dK} \nearrow$$

3.3. The Methodology

3.3.1. Econometric Technique: Panel Data Regressions

When considering data for different countries over a period of time, panel data analysis (PDA) techniques are commonly used in the econometric analysis. In my study, the GDP, employment and investment rates, human capital, institutional quality, and other variables of 81 countries are considered throughout 17 years (2000-2016). Panel analysis enables the study of economic process and its effects considering the heterogeneity of different components, through dissecting the data and penetrating its details.

PDA holds an essential place in innovative econometrics; it is known to offer an interesting environment for developing estimation techniques and theoretical results. It provides a rich study of a set of observations considering both space and time dimensions of the data and is used in sociology, psychology, social, political and health sciences. The primary advantage of a panel data set over a cross-section is that researchers are given flexibility in modeling differences in behavior across units.

PDA provides the following:

- Regulate the heterogeneity;
- Reduce risks of multicollinearity.
- Provide a useful study of the dynamics of adjustment and duration of economic states.
- Measure effects which are not computable in pure cross-section and time series data.
- Test complex behavioral models.
- Collects micro-units, which enables the accurate testing of some of the variables

Models used to analyze panel data are the following:

- **Ordinary Least Square (OLS) or pooled: i**s a simple method of linear regression. It tries to closely "fit" a function with the data by minimizing the sum of squared errors from the data. The pooled cross-section refers to two or more independent samples of many units (large N) drawn from the same population at different periods. Its disadvantage is that it takes the data as a whole regardless of countries and years.
- **Fixed Effects:** are used when the interest is in analyzing the impact of variables that vary over time and explores the relationships between the dependent and independent variables within a unit (country, year, etc.). Each unit has its characteristics that may or may not influence the variables. Fixed Effects assumes that the points within the individual unit may impact the outcome variables and it needs to be controlled. It removes the effect of the time-invariant characteristics so

we can assess the net effect of the predictors on the outcome variable. In other terms, εit = νi + εit, where νi are unobserved specificities to each country that are invariable in time. Thus, the intercepts are different in different countries.

- **Random Effects:** are used when the variation across entities is assumed to be random and uncorrelated with the independent variables as opposed to the fixed effect model. When considering that differences across entities have influence on the dependent variable, the random effect is the best method to use. It includes the invariant variables.

3.3.2. Statistical Analysis

The statistical analysis was conducted using the R statistical program, and the results were double-checked using E-views.

Before starting the analysis and deciding between dynamic and regular panel analysis, each of the variables underwent a unit root test (refer to Appendix 2) and were concluded to be stationary. As a result, the panel linear model regression analysis was conducted.

The analysis for each equation was done using pooled, fixed and random effects (refer to Appendix 3). To select the best fit for the data: Hausman, F, and Lagrange Multiplier tests were conducted to choose respectively between pooled and fixed effects, fixed and random effects as well as random effects and pooled. As a result, the fixed effects model was concluded to be the most appropriate (p-value of <0.05 for all tests as shown in Appendix 3).

The data later was tested for serial correlation and heteroscedasticity using Breush-Godfrey/Wooldrige and Breush-Pagan tests. The presence of serial correlation and

heteroscedasticity is common in panel data. The literature on the matter confirms that both serial correlation and heteroscedasticity are a concern when the number of countries is small and the number of years very large, which is not the case in our data. Still, the Arellano method was used to control for both problems and cluster the standard errors in the model. The variables were tested again for their significance. Some of them have moved from being significant to not significant as discussed in the next section (5.4). Complete tests are presented for each of the 24 equations in Appendix 5.

3.4. Data Description

The impact of PPP investments in infrastructure on economic growth is a macroeconomic topic, which calls for a quantitative approach. The data includes observations on economic growth, employment rates, human capital, investments in PPPs and institutional quality indicators. Thus, the study used secondary data collected from internationally recognized institutions such as the World Bank, The United Nations, and the ILO.

Initially, the data covered 125 developing countries throughout 20 years (1998-2017). However, due to missing observations across variables and in different countries, the data was balanced and reduced to include 81 developing countries over the period 2000 – 2016 (Appendix 1).

The description and source of each variable used in our model are presented below:

- **GDP**: The Real GDP per capita (constant 2010$) derived from the World Bank database. Using per capita GDP takes into account the size of the market.
- **IPPP**: the investments in Public-Private Partnerships, derived from the World Bank "private participation in infrastructure" database. This variable was also adjusted (divided by population) to take into account the size of the investment in relation to the size of the market.

- **K**: other investments in each country, derived from considering the Gross Capital Formation minus the PPP investments in each country. The data for the Gross Capital Formation (GCF) was obtained from the World Bank database. Other investments were also taken per capita.
- **L:** the employment over population ratio, derived from the World Bank database ILO estimates. It represents the number of people (15 years +) who are actively participating in the labor force over the total population.
- **HDI:** The Human Development Index, derived from the UNDP human development report of 2017. It is a statistical index including education levels, life expectancy and standards of living.
- **IQ:** the institutional quality of a country, derived from World Bank database, based on the estimates of the six governance indicators (WGI): Political Stability, Control of Corruption, Regulatory Quality, Government Effectiveness, Voice and Accountability, and Rule of Law. The lack of data for the year 2001 has been compensated for by using the average of the indicators of 2000 and 2002.

3.4.1. Descriptive Statistics

Descriptive statistics (Table 11) facilitates the study of the variables in the model; it is the basis for quantitative analysis providing summaries of the data under investigation. The sample size is of 1377 observations, representing each of the variables mentioned above for 17 years for 81 countries.

Table 12: Descriptive statistical representation of the data.

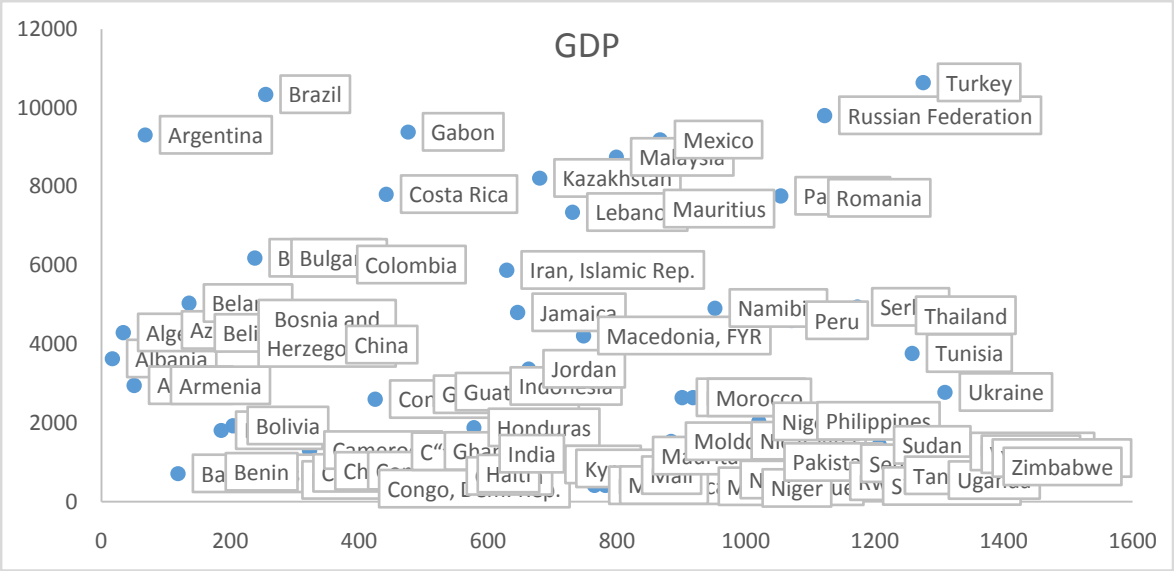
	Mean	Median	Std. Dev.	Kurtosis	Skewness	Min	Max
GDP	3,311.00	2,158	2,989.76	0.28	1.09	256.54	14,117.44
IPPP	18.97	0	49.04	28.81	4.61	0	570.85
K	733.91	410.89	814.26	4.79	1.89	1.53	5,913.54
L	58.05	58.43	12.63	-0.54	0.08	30.60	87.82
HDI	0.60	0.62	0.14	-1.01	-0.37	0.25	0.82
IQ1	-0.54	-0.46	0.80	-0.25	-0.3	-2.81	1.28
IQ2	-0.57	-0.61	0.52	0.65	0.73	-1.72	1.28
IQ3	-0.39	-0.36	0.58	-0.08	-0.27	-2.24	1.13
IQ4	-0.46	-0.49	0.56	0.06	0.11	-2.06	1.27
IQ5	-0.43	-0.37	0.68	-0.73	-0.12	-2.12	1.15
IQ6	-0.57	-0.58	0.55	-0.06	0.26	-1.91	1.08

The Dependent Variable:

GDP per Capita (GDP) has a mean of USD 3,311, a median of 2,158with a standard deviation of USD 2,989.76, holding a minimum value of USD 256.54 and Maximum of USD 14,117.44 in the developing countries under study.

The difference between the mean and the median in GDP shows that the majority of the countries in all years under study have a GDP per capita less than the average. Which indicates that the mean is overvalued because of the high rates of GDP in some countries, especially emerging countries, leading to an asymmetric distribution.

Figure 7: Mean Distribution of GDP according to Countries.

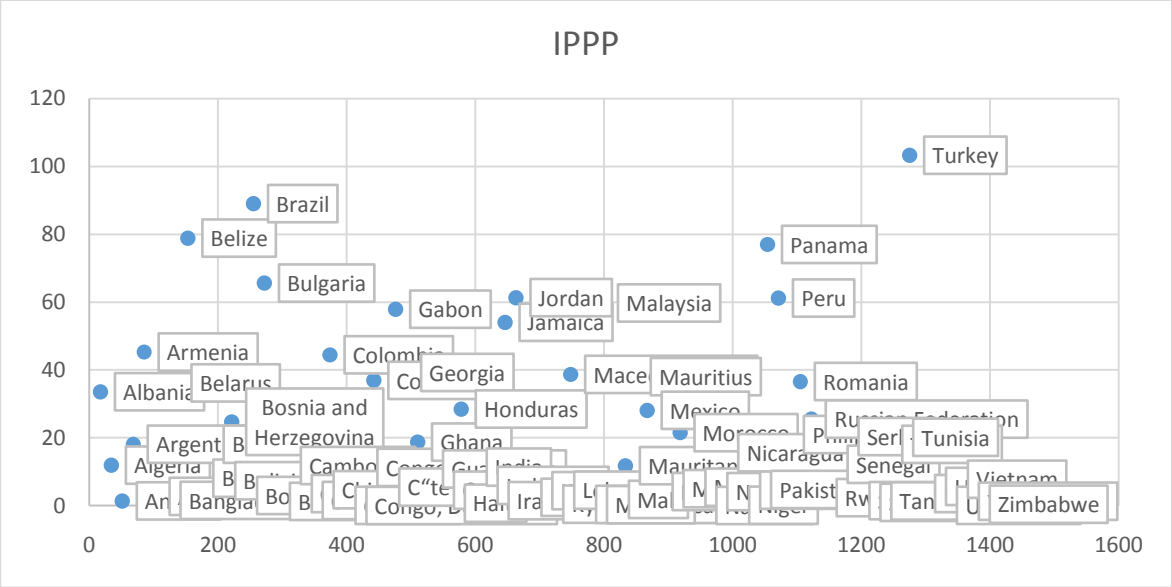


The Independent Variables:

Investment in Public Private Investments (IPPP) has a mean of USD 18.96 million, median of no investments with a standard deviation of USD 49.04. The minimum investment is considered the lack of investment in Public private partnerships, while the maximum among the developing countries under study is USD 570.85 million.

The difference between the mean and the median in PPP investments shows that the majority of the investments in PPPs in all the countries for all the years have a value less than the average. Which indicates that the mean is overvalued because of the high PPP investment rates in some countries, especially emerging countries, leading to an asymmetric distribution.

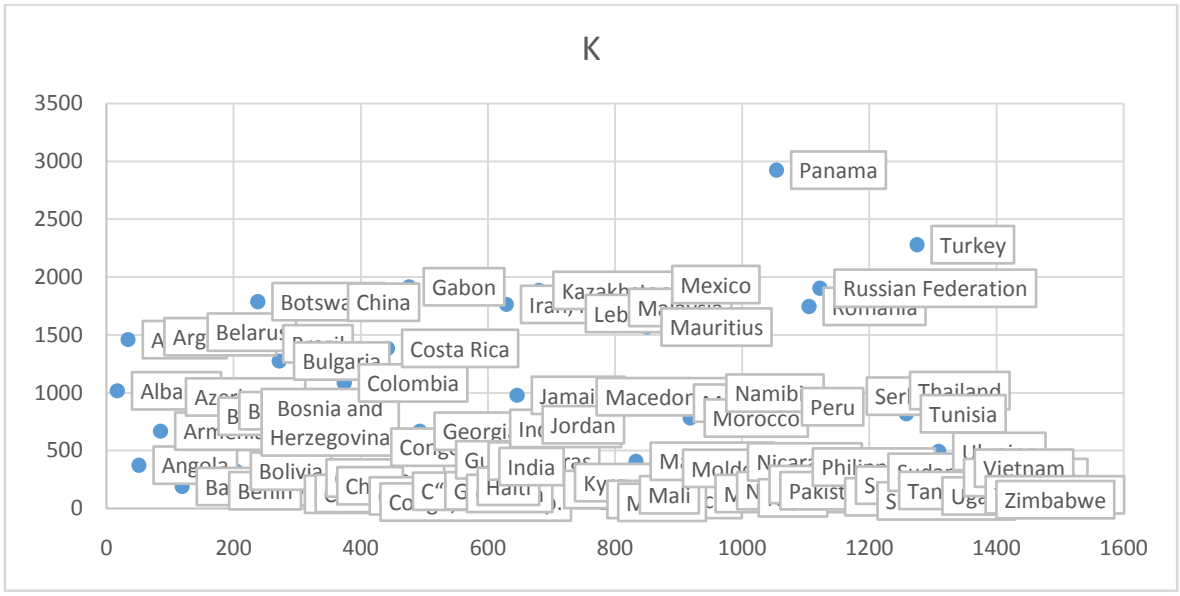
Figure 8: Mean Distribution of IPPP according to Countries.



Other Investments (K) has a mean of USD 733.91 million, median of 410.89 million with a standard deviation of USD 814.26 m. The minimum investment among all the developing countries under study is USD 1.59 million, while the maximum is USD 5913.54 million.

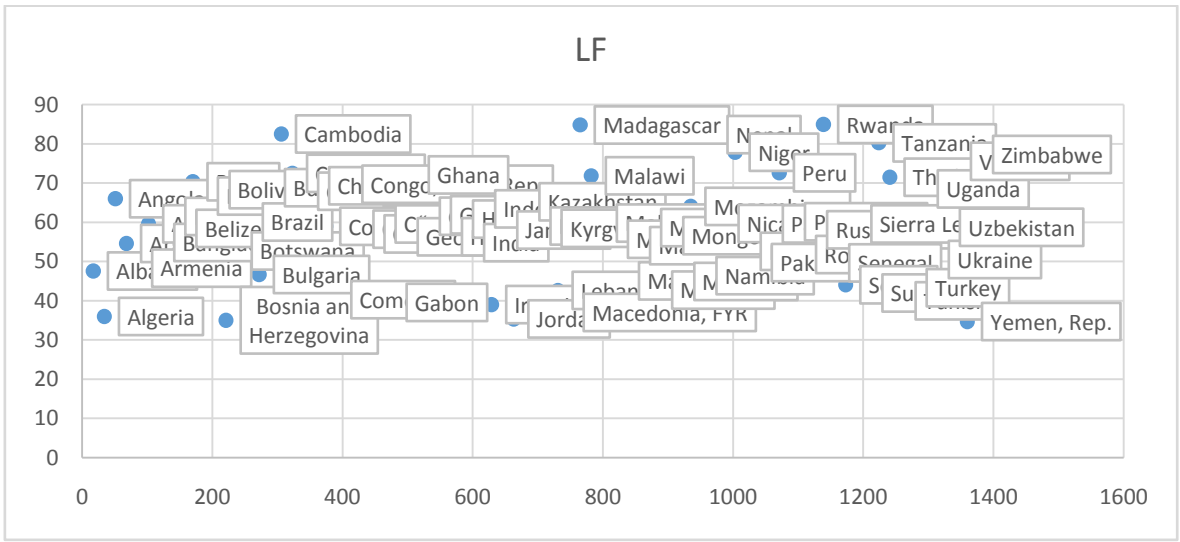
The difference between the mean and the median in other investments shows that the majority of the investments in all the countries for all the years under study have a value less than the average. Which indicates that the mean is overvalued because of the high investment rates in some countries, especially emerging countries and that the distribution is asymmetric.

Figure 9: Mean Distribution of other investments according to Countries.



Employment over population ratio (L) has a mean of 58.05%, a median of 58.43% with a standard deviation of 12.63%. The minimum employment rate among all the developing countries and years under study is 30.60% while the maximum is 87.82%.

Figure 10: Mean Distribution of labor force according to Countries.



Human Development Index (HDI) has a mean of 0.59, median of 0.62 with a standard deviation of 0.14. The minimum HDI among the developing countries and years under study was recorded to be 0.25 and maximum 0.82.

Figure 11: Mean Distribution of HDI according to Countries.

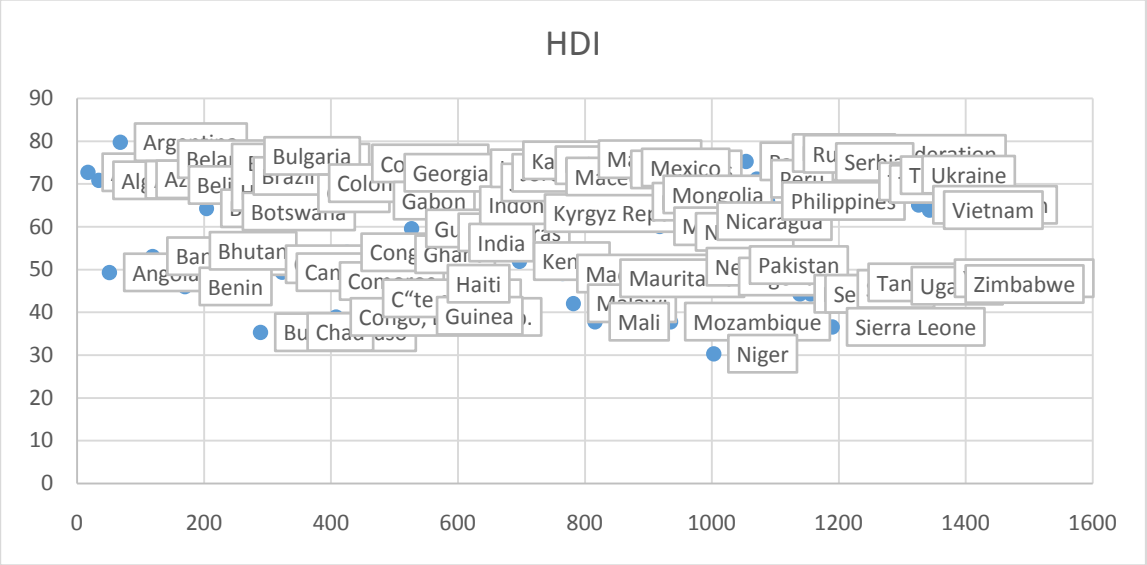
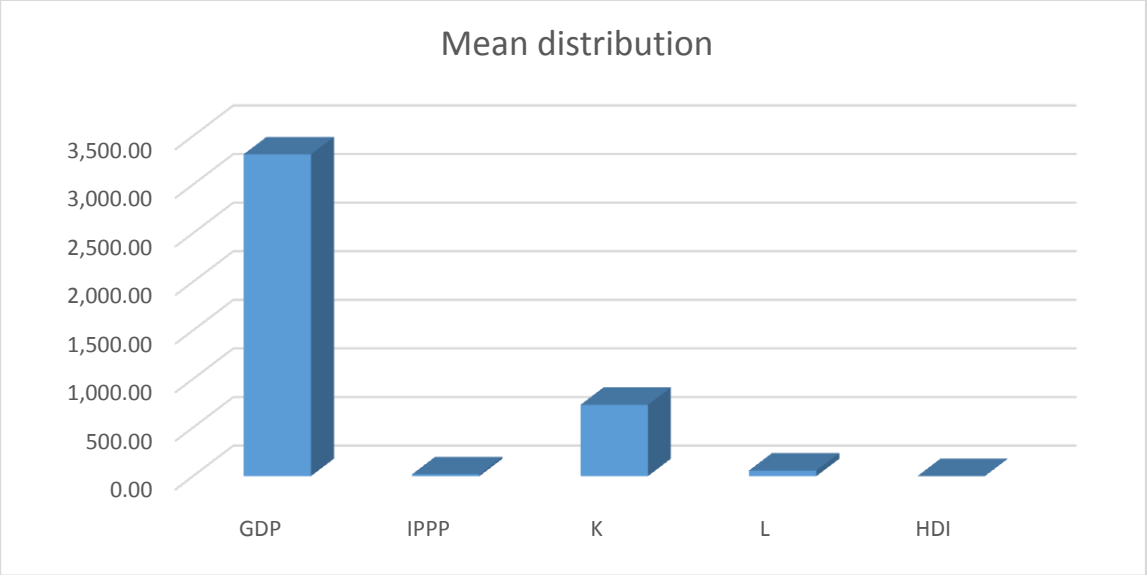


Figure 12: Mean distribution of GDP, IPPP, K, L and HDI for 81 developing countries from 2000-2017.



Institutional Quality (IQ):

- **Political Stability (IQ1)** has a mean of -0.54, median of -0.46 with a standard deviation of 0.8. The minimum political stability index recorded among the developing countries under study through the 17 years was -2.81 and maximum 1.28.

- **Control of Corruption (IQ2)** has a mean of -0.57, median of -0.61 with a standard deviation of 0.52. The minimum control of corruption index recorded among the developing countries under study through the 17 years was -1.72 and maximum 1.28.

- **Regulatory Quality (IQ3)** has a mean of -0.38, median of -0.36 with a standard deviation of 0.58. The minimum regulatory quality index recorded among the developing countries under study through the 17 years was -2.24 and maximum 1.13.

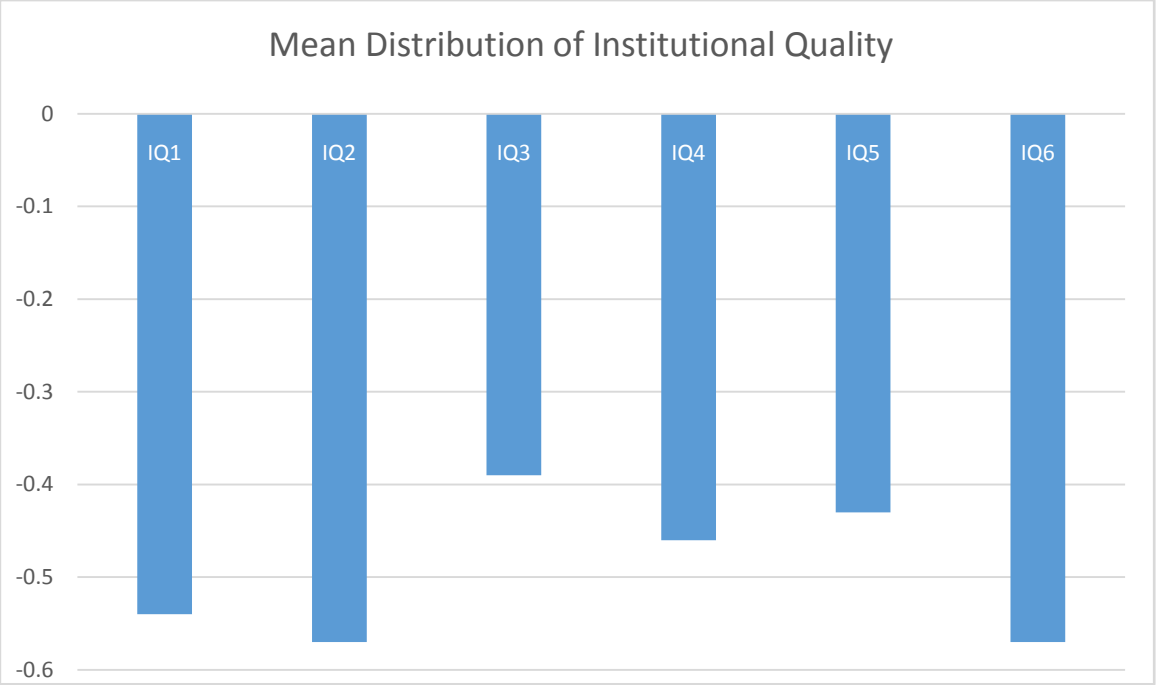
- **Government Effectiveness (IQ4)** has a mean of -0.45, median of -0.49 with a standard deviation of 0.55. The minimum government effectiveness index recorded among the developing countries under study through the 17 years was -2.06 and maximum 1.27.

- **Voice and Accountability (IQ5)** has a mean of -0.42, median of -0.37 with a standard deviation of 0.68. The minimum voice and accountability index recorded

among the developing countries under study through the 17 years was -2.12 and maximum 1.15.

- **Rule of Law (IQ6)** has a mean of -0.57, median of -0.58 with a standard deviation of 0.55. The minimum rule of law index recorded among the developing countries under study through the 17 years was -1.9 and maximum 1.08.

Figure 13: Mean distribution for each of WGI for 81 countries from 2000-2017.



3.4.2. Correlation Matrix

The correlation matrix displays the correlation between the dependent and independent variables and independent variables among themselves. It is used to analyze the data before a complex statistical analysis.

Table 13: Correlation Matrix of the data

	GDP	IPPP	K	LF	HDI	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6
GDP	1.00										
IPPP	0.34	1.00									
K	0.85	0.29	1.00								
L	(0.31)	(0.11)	0.24	1.00							
HDI	0.77	0.29	0.69	(0.37)	1.00						
IQ1	0.29	0.13	0.27	0.03	0.28	1.00					
IQ2	0.39	0.21	0.35	(0.10)	0.36	0.60	1.00				
IQ3	0.49	0.29	0.39	(0.12)	0.48	0.44	0.67	1.00			
IQ4	0.55	0.24	0.48	(0.11)	0.57	0.50	0.80	0.79	1.00		
IQ5	0.32	0.20	0.20	(0.11)	0.29	0.47	0.57	0.67	0.53	1.00	
IQ6	0.42	0.23	0.38	(0.15)	0.41	0.62	0.86	0.78	0.85	0.66	1.00
PPPxK	0.10	0.14	0.07	(0.01)	0.04	(0.02)	0.04	0.04	0.06	0.09	0.07
PPPxL	0.13	0.22	0.08	(0.01)	0.07	(0.01)	0.02	0.06	0.02	(0.02)	(0.02)
PPPxHDI	0.14	0.31	0.06	(0.02)	0.05	(0.05)	0.05	0.08	0.08	0.08	0.08
PPPxIQ1	(0.01)	(0.12)	(0.01)	0.05	0.01	0.00	(0.02)	(0.01)	(0.04)	(0.01)	(0.04)
PPPxIQ2	(0.07)	(0.14)	(0.05)	(0.01)	(0.03)	0.01	(0.01)	(0.03)	(0.03)	(0.04)	(0.01)
PPPxIQ3	0.04	0.05	0.04	(0.02)	0.05	(0.05)	(0.01)	0.01	0.01	(0.01)	(0.01)
PPPxIQ4	(0.01)	0.02	0.00	(0.03)	0.00	(0.08)	(0.01)	0.01	0.02	0.02	0.03
PPPxIQ5	(0.08)	(0.19)	(0.07)	0.05	(0.03)	0.01	0.01	0.00	(0.01)	0.02	0.00
PPPxIQ6	0.10	0.01	0.03	0.02	0.05	0.04	0.03	0.03	0.00	0.04	(0.01)

Correlation analysis is also conducted to assess the relationship between all the independent variables. High scores may lead to inconsistent results. In our matrix, the smallest value was recorded as being r=0.03 between the factors “IQ1” representing the

political stability in the table and “L” representing the employment rate in the table, while the strongest was r=0.69 between the factors “K” representing other investments and “HDI” representing human development index.

It is important to note that all the six indicators of institutional quality IQ1 to IQ6 are highly correlated having r between 0.5-0.8. As indicated by the World Bank, these indicators should be taken individually in the equations to avoid multicollinearity (Kaufmann, Kraay, & Mastruzzi, 2011).

When studying the relationships between the interactive variables (IPPPxK, IPPPxL, IPPPxHDI, IPPPx IQ1, IPPPxIQ2, IPPPxIQ3, IPPPxIQ4, IPPPxIQ5, IPPPxIQ6), all the variables in the products were demeaned to avoid multicollinearity (Solverger, 2010).

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.1. Hypothesis Testing

The data was analyzed dividing the main model into six sub-models and each model into four different equations a total of twenty-four equations (EQ1-EQ24), taking each of the institutional qualities separately in an equation and each time using one of the interactive variables to test the relationship and impact between them.

Model 1 represented in 4 equations (EQ1-EQ4) considers the first institutional quality (IQ1), which is the political stability and is tested with its interactive variable (IPPPxIQ1) and all the other interactive variables (IPPPxK, IPPPxL, and IPPPxHDI) summarized in table 13:

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ1_{it} + (\beta_6 IPPP \times K_{it}) + \in_{it} \quad \text{(EQ1)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ1_{it} + (\beta_6 IPPP \times L_{it}) + \in_{it} \quad \text{(EQ2)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ1_{it} + (\beta_6 IPPP \times HDI_{it}) + \in_{it} \quad \text{(EQ3)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ1_{it} + (\beta_6 IPPP \times IQ1_{it}) + \in_{it} \quad \text{(EQ4)}$$

The adjusted R^2 for the model is between 0.73 and 0.74, meaning that, for the equations 1 to 4, the 73-74% the variation in the dependent variable GDP per Capita is explained by the independent variables (IPPP, K, L, HDI and Political Stability).

Model 2 represented in 4 equations (EQ5-EQ8) considers the Control of Corruption (IQ2), and is tested with its interactive variable (IPPPxIQ2) and all the other interactive variables (IPPPxK, IPPPxL, and IPPPxHDI), summarized in table 14:

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ2_{it} + (\beta_6 IPPP \times K_{it}) + \epsilon_{it} \text{ (EQ5)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ2_{it} + (\beta_6 IPPP \times L_{it}) + \epsilon_{it} \text{(EQ6)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ2_{it} + (\beta_6 IPPP \times HDI_{it}) + \epsilon_{it} \text{ (EQ7)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ2_{it} + (\beta_6 IPPP \times IQ2_{it}) + \epsilon_{it} \text{ (EQ8)}$$

The adjusted R^2 for the model is between 0.74, meaning that, for the equations 5 to 8, the 74% of the variation in the dependent variable GDP per Capita is explained by the independent variables (IPPP, K, L, HDI, and Control of Corruption).

Model 3 represented in 4 equations (EQ9-EQ12) considers the Regulatory Quality (IQ3), and is tested with its interactive variable (IPPPxIQ3) and all the other interactive variables (IPPPxK, IPPPxL, and IPPPxHDI), summarized in table 15:

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ3_{it} + (\beta_6 IPPP \times K_{it}) + \epsilon_{it} \text{ (EQ9)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ3_{it} + (\beta_6 IPPP \times L_{it}) + \epsilon_{it} \text{(EQ10)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ3_{it} + (\beta_6 IPPP \times HDI_{it}) + \epsilon_{it} \text{ (EQ11)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ3_{it} + (\beta_6 IPPP \times IQ3_{it}) + \epsilon_{it} \text{ (EQ12)}$$

The adjusted R^2 for the model is between 0.76, meaning that, for the equations 9 to 12, the 76% of the variation in the dependent variable GDP per Capita is explained by the independent variables (IPPP, K, L, HDI, and Regulatory Quality).

Model 4 represented in 4 equations (EQ13-EQ16) considers the Government Effectiveness (IQ4), and is tested with its interactive variable (IPPPxIQ4) and all the other interactive variables (IPPPxK, IPPPxL, and IPPPxHDI), summarized in table 16:

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ4_{it} + (\beta_6 IPPP \times K_{it}) + \epsilon_{it} \quad \text{(EQ13)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ4_{it} + (\beta_6 IPPP \times L_{it}) + \epsilon_{it} \quad \text{(EQ14)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ4_{it} + (\beta_6 IPPP \times HDI_{it}) + \epsilon_{it} \quad \text{(EQ15)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ4 + (\beta_6 IPPP \times IQ4_{it}) + \epsilon_{it} \quad \text{(EQ16)}$$

The adjusted R^2 for the model is between 0.75, meaning that for the equations 13 to 16, the 75% of the variation in the dependent variable GDP per Capita is explained by the independent variables (IPPP, K, L, HDI, and Regulatory Quality).

Model 5 represented in 4 equations (EQ17-EQ20) considers the Voice and Accountability (IQ5), and is tested with its interactive variable (IPPPxIQ5) and all the other interactive variables (IPPPxK, IPPPxL, and IPPPxHDI), summarized in table 17:

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ5 + (\beta_6 IPPP \times K_{it}) + \epsilon_{it} \quad \text{(EQ17)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ5_{it} + (\beta_6 IPPP \times L_{it}) + \epsilon_{it} \quad \text{(EQ18)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ5 + (\beta_6 IPPP \times HDI_{it}) + \epsilon_{it} \quad \text{(EQ19)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ5_{it} + (\beta_6 IPPP \times IQ5_{it}) + \epsilon_{it} \quad \text{(EQ20)}$$

The adjusted R^2 for the model is approximately 0.74, meaning that, for the equations 17 to 20, the 74% of the variation in the dependent variable GDP per Capita is explained by the independent variables (IPPP, K, L, HDI, and Voice and Accountability).

Model 6 represented in 4 equations (EQ21-EQ24) considers the Rule of Law (IQ6), and is tested with its interactive variable (IPPPxIQ6) and all the other interactive variables (IPPPxK, IPPPxL, and IPPPxHDI), summarized in table 18:

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ6_{it} + (\beta_6 IPPP \times K_{it}) + \epsilon_{it} \quad \text{(EQ21)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ6_{it} + (\beta_6 IPPP \times L_{it}) + \epsilon_{it} \quad \text{(EQ22)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ6_{it} + (\beta_6 IPPP \times HDI_{it}) + \epsilon_{it} \quad \text{(EQ23)}$$

$$GDP_{it} = \alpha + \beta_1 IPPP_{it} + \beta_2 K_{it} + \beta_3 L_{it} + \beta_4 HDI_{it} + \beta_5 IQ6_{it} + (\beta_6 IPPP \times IQ6_{it}) + \epsilon_{it} \quad \text{(EQ24)}$$

The adjusted R^2 for the model is 0.74, meaning that, for the equations 17 to 20, the 74% of the variation in the dependent variable GDP per Capita is explained by the independent variables (IPPP, K, L, HDI, and Rule of Law).

Table 14: Analysis Results for Model 1

Dependent Variable GDP per Capita (Constant 2010)	EQ 1	EQ 2	EQ 3	EQ 4
IPPP	**1.089*** **	**0.953*** **	**0.957*** **	**1.097*** **
t-statistics	4.4329	3.8271	3.7595	4.4454
p-value	1.009E-05	0.0001359	0.0001779	0.000009528
K	**1.089*** **	**1.093*** **	**1.089*** **	**1.088*** **
t-statistics	39.94	40.1553	39.975	39.8528
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
L	**20.204*** **	**21.134*** **	**19.410*** **	**20.195*** **
t-statistics	4.1544	4.3508	3.9887	4.1463
p-value	3.476E-05	0.00001463	0.00007017	0.00003599
HDI	**5568.1*** **	**5181.8*** **	**5340.6*** **	**5274.3*** **
t-statistics	13.9908	13.816	14.2277	14.0397
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
PolStability	**45.801**	**43.715**	**47.01**	**45.304**
t-statistics	1.5243	1.4592	1.5654	1.5058
p-value	0.12767	0.1447671	0.1177429	0.1324
IPPPxK	**0.063***			
t-statistics	2.1001			
p-value	0.03591			
IPPPxL		**0.0086*** **		
t-statistics		3.5265		
p-value		0.0004358		
IPPPxHDI			**0.294***	
t-statistics			2.4654	
p-value			0.0138146	
IPPPxPolStability				**-0.016**
t-statistics				-1.1059
p-value				0.269
Fixed Effects				
R square	0.75567	0.75717	0.75598	0.75506
Adjusted R	0.73938	0.74098	0.73971	0.73873
F-Statistic	664.941	670.397	666.074	662.774
P-Value	2.22E-16	2.22E-16	2.22E-16	2.22E-16

Significant. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 15: Analysis Results for Model 2

Dependent Variable GDP per Capita (Constant 2010)	EQ 5	EQ 6	EQ 7	EQ 8
IPPP	**1.1*** **	**0.963*** **	**0.96*** **	**1.073*** **
t-statistics	4.4995	3.8837	3.7895	4.365
p-value	0.000007426	0.0001081	0.0001579	0.00001373
K	**1.087**	**1.090*** **	**1.087*** **	**1.083*** **
t-statistics	40.0304	40.2483	40.0751	39.8911
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
L	**20.727*** **	**21.66*** **	**19.924*** **	**20.885596*** **
t-statistics	4.2795	4.4779	4.1126	4.3101
p-value	0.00002011	8.2034E-06	0.00004159	0.00001756
HDI	**5504.8*** **	**5121.9*** **	**5283*** **	**5212.78*** **
t-statistics	13.8827	13.71	14.1343	13.95
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
Control Corruption	**226.9*** **	**227.12*** **	**234.14*** **	**226.68*** **
t-statistics	3.68	3.6956	3.7986	3.6761
p-value	0.0002429	0.0002285	0.0001523	0.0002465
IPPPxK	**0.062305***			
t-statistics	2.0688			
p-value	0.0387594			
IPPPxL		**0.0086765*** **		
t-statistics		3.5519		
p-value		0.0003962		
IPPPxHDI			**0.30803** **	
t-statistics			2.5889	
p-value			0.0097363	
IPPPx Control Corruption				**-0.065***
t-statistics				-2.0193
p-value				0.0436654

Fixed Effects				
R square	0.75777	0.75932	0.75822	0.75773
Adjusted R	0.74162	0.74327	0.7421	0.74158
F-Statistic	672.58	678.296	674.241	672.441
P-Value	2.22E-16	2.22E-16	2.22E-16	2.22E-16

Significant. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 16: Analysis Results for Model 3

Dependent Variable GDP per Capita (Constant 2010)	EQ 9	EQ 10	EQ 11	EQ 12
IPPP	**0.942*** **	**0.799*** **	**0.812*** **	**0.993*** **
t-statistics	3.9943	3.3394	3.3206	4.2363
p-value	6.855E-05	0.0008636	0.0009235	0.00002434
K	**1.077*** **	**1.080*** **	**1.076*** **	**1.077*** **
t-statistics	41.1225	41.3836	41.1627	41.3154
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
L	**21.641*** **	**22.614*** **	**20.873*** **	**22.493*** **
t-statistics	4.6368	4.8547	4.4706	4.8297
p-value	3.897E-06	0.000001353	8.486E-06	0.00000153
HDI	**5238.3*** **	**4862.3*** **	**5026.48*** **	**4885.8*** **
t-statistics	13.6864	13.4907	13.92	13.5698
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
RegulatoryQuality	**5717.6*** **	**5744.3*** **	**572.773*** **	**6245.4*** **
t-statistics	10.6766	10.7687	10.705	11.3319
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
IPPPxK	**0.059778***			
t-statistics	2.06			
p-value	0.0396			
IPPPxL		**0.00894*** **		
t-statistics		3.7811		
p-value		0.0001633		
IPPPxHDI			**0.28861***	
t-statistics			2.5188	
p-value			0.0118952	
IPPPxRegQuality				**0.101*** **
t-statistics				3.7218
p-value				0.0002063

Fixed Effects				
R square	0.7751	0.77683	0.77546	0.77676
Adjusted R	0.76011	0.76195	0.76049	0.76187
F-Statistic	740.974	748.399	742.526	748.071
P-Value	2.22E-16	2.22E-16	2.22E-16	2.22E-16

Significant. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 17: Analysis Results for Model 4

Dependent Variable GDP per Capita (Constant 2010)	EQ 13	EQ 14	EQ 15	EQ 16
IPPP	**1.108*** **	**0.978*** **	**0.976*** **	**1.137*** **
t-statistics	4.6889	4.0774	3.9841	4.8196
p-value	3.038E-06	0.00004832	0.00007154	0.000001609
K	**1.054*** **	**1.058*** **	**1.054*** **	**1.053*** **
t-statistics	39.8339	40.0416	39.8654	39.7962
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
L	**23.119*** **	**23.999*** **	**22.328*** **	**22.701*** **
t-statistics	4.9287	5.1225	4.7578	4.8367
p-value	9.354E-07	3.473E-07	0.000002178	0.000001479
HDI	**5526.1*** **	**5143.1*** **	**5300.9*** **	**5254*** **
t-statistics	14.4407	14.2622	14.6903	14.5679
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
Gov'tEffectiveness	**585.43*** **	**582.73*** **	**5861.1*** **	**593.54*** **
t-statistics	10.19	10.173	10.2093	10.3008
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
IPPPxK	**0.063234***			
t-statistics	2.1713			
p-value	0.03009			
IPPPxL		**0.00839*** **		
t-statistics		3.5517		
p-value		0.0003965		
IPPPxHDI			**0.29595***	
t-statistics			2.5733	
p-value			0.01018	
IPPPx Gov'tEffectiveness				**0.081527***
t-statistics				1.9391
p-value				0.0527

Fixed Effects				
R square	0.77346	0.77483	0.77379	0.77329
Adjusted R	0.75836	0.75982	0.75871	0.75818
F-Statistic	734.061	739.852	735.459	733.361
P-Value	2.22E-16	2.22E-16	2.22E-16	2.22E-16

Significant. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 18: Analysis Results for Model 5

Dependent Variable GDP per Capita (Constant 2010)	EQ 17	EQ 18	EQ 19	EQ 20
IPPP	**1.099*** **	**0.961*** **	**0.968*** **	**1.077*** **
t-statistics	4.4727	3.8573	3.8035	4.3066
p-value	0.000008402	0.0001203	0.0001494	0.00001783
K	**1.086*** **	**1.089*** **	**1.085*** **	**1.084*** **
t-statistics	39.5773	39.794	39.607	39.5025
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
L	**19.808*** **	**20.70*** **	**18.97*** **	**19.70*** **
t-statistics	4.0488	4.2381	3.8769	4.0233
p-value	0.00005455	0.00002414	0.0001111	0.00006073
HDI	**5652.15*** **	**5274.7*** **	**5437.47*** **	**5375.29*** **
t-statistics	14.0954	13.91	14.3277	14.1596
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
VoiceAccount	**-54.225**	**-5.85**	**-59.99**	**-63.6**
t-statistics	-0.9498	-1.03	-1.053	-1.1131
p-value	0.34237	0.3031	0.29255	0.2659
IPPPxK	**0.062***			
t-statistics	2.0472			
p-value	0.04084			
IPPPxL		**0.0087*** **		
t-statistics		3.5457		
p-value		0.0004056		
IPPPxHDI			**0.2912***	
t-statistics			2.4369	
p-value			0.0149468	
IPPPx VoiceAccount				**-0.0519**
t-statistics				-1.2285
p-value				0.2195

Fixed Effects				
R square	0.7554	0.75697	0.75573	0.75489
Adjusted R	0.73909	0.74077	0.73944	0.73855
F-Statistic	663.973	669.665	665.16	662.151
P-Value	2.22E-16	2.22E-16	2.22E-16	2.22E-16

Significant. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 19: Analysis Results for Model 6

Dependent Variable GDP per Capita (Constant 2010)	EQ 21	EQ 22	EQ 23	EQ 24
IPPP	**1.024*** **	**0.8719*** **	**0.894*** **	**1.033*** **
t-statistics	4.23	3.5508	3.5658	4.2741
p-value	0.00002502	0.0003979	0.000376	0.0000206
K	**1.086*** **	**1.090*** **	**1.086*** **	**1.085*** **
t-statistics	40.4411	40.7144	40.4745	40.4331
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
L	**23.049*** **	**24.136*** **	**22.285*** **	**22.823*** **
t-statistics	4.7926	5.0284	4.6311	4.7478
p-value	0.000001837	5.643E-07	0.000004004	0.000002287
HDI	**5141.8*** **	**4745.8*** **	**4924.3*** **	**4871.4898*** **
t-statistics	12.923	12.6508	13.1103	12.9869
p-value	2.2E-16	2.2E-16	2.2E-16	2.2E-16
RuleLaw	**411.56*** **	**422.15*** **	**412.61*** **	**411.845*** **
t-statistics	6.4584	6.6481	6.48	6.46
p-value	1.496E-10	4.372E-11	1.302E-10	1.428E-10
IPPPxK	**0.0609*** **			
t-statistics	2.0442			
p-value	0.04114			
IPPPxL		**0.0093*** **		
t-statistics		3.851		
p-value		0.0001234		
IPPPxHDI			**0.288***	
t-statistics			2.4477	
p-value			0.014509	
IPPPxRuleLaw				-0.0764*
t-statistics				-2.2691
p-value				0.02343

Fixed Effects				
R square	0.76289	0.76483	0.76322	0.76307
Adjusted R	0.74708	0.74915	0.74744	0.74727
F-Statistic	691.759	699.222	693.029	692.439
P-Value	2.22E-16	2.22E-16	2.22E-16	2.22E-16

Significant. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

The panel data analysis for all the equations regarding the impact of PPP on GDP per capita in developing countries shows that its effect is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H1.

H1: Private investments commitment in public private partnerships in infrastructure positively affect GDP per Capita.

The panel data analysis for all the equations regarding the effect of other investments on GDP per capita in developing countries shows that its impact is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H2.

H2: Other investments positively affects GDP per Capita.

The panel data analysis for all the equations regarding the effect of PPP investments on marginal impact of other investments on GDP per capita in developing countries shows that its impact is statistically significant, for it showed a p-value of 0.03 (<0.05). Thus we accept the below hypothesis H3.

H3: Investments in PPP affect positively the marginal impact of other investments on GDP per Capita.

The panel data analysis for all the equations regarding the positive impact of Employment rate on GDP per capita in developing countries shows that its impact is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H4.

H4: Employment rate positively affects GDP per Capita.

The panel data analysis for all the equations regarding the effect of PPP investments on marginal impact of employment rate on GDP per capita in developing countries shows that its impact is statistically significant, for it showed a p-value of 0.0004 (<0.05). Thus we accept the below hypothesis H5.

H5: Private investments commitment in public private partnerships in infrastructure affect positively the marginal impact of employment rate on GDP per capita

The panel data analysis for all the equations regarding the effect of human development index on GDP per capita in developing countries shows that its impact is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H6.

H6: HDI positively affects GDP per capita

The panel data analysis for all the equations regarding the effect of PPP investments on marginal impact of human development index on GDP per capita in developing countries shows that its impact is statistically not significant, for it showed a p-value of 0.0010 (<0.05). Thus we reject the below hypothesis H7.

H7: Private investments commitment in public private partnerships in infrastructure affect positively the marginal impact of HDI on GDP per capita.

As per Table 13, the panel data analysis regarding the positive effect of political stability of a country on GDP per capita in developing countries shows that its impact is statistically

non-significant, for it showed a p-value of 0.12 (>0.05). Thus we reject the below hypothesis H8.

H8: Political stability of the country of the investment positively affects GDP per capita.

As per Table 13, the panel data analysis regarding the effect of political stability of a developing country on the marginal impact of Public Private Partnership investments on GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.2 (>0.05). Thus we reject the below hypothesis H9.

H9: Political stability affects positively the marginal impact of investments in PPP on GDP per capita.

As per Table 14, the panel data analysis regarding the positive effect of control of corruption of a developing country on its GDP per capita shows that its impact is statistically significant, for it showed a p-value of 0.0002 (<0.05). Thus we accept the below hypothesis H10.

H10: Control of corruption of the country positively affects GDP per capita.

As per Table 14, the panel data analysis regarding the effect of control of corruption of a developing country on the marginal impact of Public Private Partnership investments on GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.065 (>0.05). Thus we reject the below hypothesis H11.

H11: Control of corruption affects positively the marginal impact of investments in PPP on GDP.

As per Table 15, the panel data analysis regarding the positive effect of regulatory quality of a developing country on its GDP per capita shows that its impact is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H12.

H12: Regulatory quality of the country positively affects GDP per capita.

As per Table 15, the panel data analysis regarding the effect of regulatory quality of a developing country on the marginal impact of Public Private Partnership investments on GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.0002 (<0.05). Thus we reject the below hypothesis H13.

H13: Regulatory quality affects positively the marginal impact of investments in PPP on GDP per capita.

As per Table 16, the panel data analysis regarding the positive effect of government effectiveness of a developing country on its GDP per capita shows that its impact is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H14.

. ***H14: Government effectiveness positively affects GDP per capita.***

As per Table 16, the panel data analysis regarding the effect of government effectiveness of a developing country on the marginal impact of Public Private Partnership investments on GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.05 (=0.05). Thus we reject the below hypothesis H15.

H15: Government effectiveness affects positively the marginal impact of investments in PPP on GDP per capita.

As per Table 17, the panel data analysis regarding the positive effect of voice and accountability of a developing country on its GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.3 (>0.05). Thus we reject the below hypothesis H16.

H16: Voice and accountability positively affects GDP per capita

As per Table 17, the panel data analysis regarding the effect of Voice and Accountability of a developing country on the marginal impact of Public Private Partnership investments on GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.2 (>0.05). Thus we reject the below hypothesis H17.

H17: Voice and accountability affects positively the marginal impact of investments in PPP on GDP.

As per Table 18, the panel data analysis regarding the positive effect of rule of law of a developing country on its GDP per capita shows that its impact is statistically significant, for it showed a p-value of 0.0000 (<0.05). Thus we accept the below hypothesis H18.

. ***H18: The Rule of law of the country positively affects GDP per capita.***

As per Table 18, the panel data analysis regarding the effect of the rule of law of a developing country on the marginal impact of Public Private Partnership investments on

GDP per capita shows that its impact is statistically non-significant, for it showed a p-value of 0.02 (>0.05). Thus we reject the below hypothesis H19.

H19: The Rule of law affects positively the marginal impact of investments in PPP on GDP per capita.

Table 20: Summary of hypothesis testing

Hypothesis	Tests	Significant
H1	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H2	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H3	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H4	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H5	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Marginally
H6	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H7	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Marginally
H8	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No
H9	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No

H10	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H11	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No
H12	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H13	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H14	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H15	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No
H16	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No
H17	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No
H18	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	Yes
H19	Panel Regression Analysis/ Pooled, Fixed and Random models/ Hausman Test/ F test / Lagrange Multiplier test /Breush-Pagan test/Arellano method	No

4.2. Research Discussion

To recapitulate, this study on a sample of 81 developing countries for the period 2000-2016 considered first, the direct impact of public private partnerships' investments in infrastructure on GDP. Second, it studied their indirect impact on GDP through their effect on other investments, employment rate and human development index. Lastly, it examined the effect of each of the six indicators of institutional quality on PPP investments and hence on the marginal effect of the latter on GDP.

4.2.1. Investment in PPPs

Zhang mentioned that FDIs in public goods speed up the economic growth of the receiving country(Zhang, 2005). In this thesis, PPP investments were taken separately from other investments to study their effect on GDP in the developing countries and to further explore its effect on all of the above mentioned components of an economy. From a closer look at the PPP projects' characteristics and according to the literature, one can note that most projects in developing countries, were executed by multinational companies, given the size of infrastructure projects generally and the know-how and technologies involved (Narula & Dunning, 2000).

As detailed in the literature review, the GDP is positively elastic to the quality of infrastructure(Calderón, Moral-Benito, & Servén, 2011).In this paper, investment in public private partnerships in infrastructure was found to be highly significant, the most significant among all the other tested variables. Concluding that, investments in PPPs are one of the primary contributors to the increase of the GDP per capita of a country in the developing world, which means that PPP could serve governments as a way to build the infrastructure of a country from one hand and energize the economy from the other.

4.2.2. Other investments:

Investment is recognized to be the most important contributor to growth. Previous literature on the subject shows the economists' emphasis on the importance of capital investments on the increase in GDP (De Long & Summers, 1991). Hence, this study tried to explore this relationship further, focusing on developing countries and dividing the investment into infrastructure investments using public private partnerships and other investments. The aim was to see how investments in general affect GDP and most importantly if public private partnership investments affect other investments and their marginal impact on GDP.

The significant results of this study concurred with the production function theory of Solow and showed that investments have a direct positive effect on GDP per capita, meaning that the investments in developing countries will increase economic growth.

The highly significant results in testing the relationship between investments in public private partnership in driving other investments showed that countries when investing in PPP projects, indirectly create new investment opportunities for the other supporting sectors of the economy, and hence magnify their effect on the economy. We can conclude that public private partnership investments in infrastructure projects not only directly positively affect the GDP of a developing country, but also indirectly through inducing investments in other complementary sectors of the economy and hence energizing the overall investments in the developing countries (Hendra & Ichihashi, 2012).

4.2.3. Labor Force Participation

The labor force is another important factor affecting growth. Previous literature on the subject shows the economists' emphasis on the importance of labor force participation on

the increase in GDP (Raleva, 2017). Hence, this study tried to explore this relationship further, focusing on developing countries. The aim was to see how labor force participation in general affects GDP and most importantly if public private partnership investments affect its marginal impact on GDP.

The previous literature, in addition, found employment to be elastic to infrastructure investments (Estache & Garsous, 2012), creating new job opportunities. While in some other instances, it was seen to reduce the employment number and increase productivity.

In this study, the significant findings show that employment rate positively affects GDP per capita concurring with the production function of Solow. Moreover, the study found substantial results which became marginally significant at 10% bracket after controlling for serial correlation, adds on the positive impact of public private partnerships in infrastructure on employment rate showing that these investments indeed create new employment opportunities and contribute to the increase of GDP, but might need time to take effect. The high significance of the positive effect of employment on GDP per capita and the marginally significant impact of public private partnerships on the marginal impact of employment show that public private partnerships in developing countries can be an important factor in job creation and hence improving the living standards and reducing inequality levels among the citizens.

4.2.4. Human Capital

Human capital was seen to affect the economic growth of a country. According to previous research, ample and good quality infrastructure would result in better health, education, and living standards which are important determinants of economic growth(Moreno-Dodson & Agénor, 2006). In this study, the Human Development Index was used to

measure the human capital and was found to be significant indirectly affecting GDP per capita, hence economic growth.

While when studying the effect of PPP investment on the marginal impact of HDI on GDP per capita, the results were found to be significant at first but became marginally significant at a 9% bracket after controlling for serial correlation, which means that PPP investments in infrastructure might need some time to take effect on the human development index. In the literature review, it was mentioned that sound infrastructure would improve access to schools and educational facilities and improve education levels as well as aid in better health services, leading to a healthier life (Brenneman & Kerf, 2002). Although infrastructure has a positive effect on health and education, yet time might be needed for PPP projects in infrastructure to be completed and start affecting the health, education, and standard of living of the citizens, hence HDI.

4.2.5. Institutional Quality

4.2.5.1. Political Stability and Absence of Violence/Terrorism

Referring to North and Romer's theoretical contributions in the field of economic growth, the institutional quality is linked to economic growth. The results of this study didn't find political stability, which is one of the indicators used to measure institutional quality to affect GDP in developing countries.

The previous literature has mentioned a positive relationship between political stability and PPP projects: according to Fitzgerald (2014), the stable political environment is necessary for the success of PPPs. This study tried to explore the effect of political stability on PPP investments and economic growth in developing countries, but the non-significant results failed to prove this relationship. This might be due to the fact that the study entailed most

of the developing countries, which have different structural, economic and political formation, which might have influenced the results.

4.2.5.2. Control of Corruption

Control of Corruption is another indicator used to measure institutional quality, the result of the study found a significant positive relationship between control of corruption and GDP per capita, meaning that the more a country has control over corruption, the better will the GDP per capita be.

Osborne considers control of corruption a major indicator in the success of PPP programs (2000), but the result of this study didn't find positive relationship between control of corruption and the marginal effect of PPP investments on GDP. It might be as well due to the diversity of the countries involved within the developing world; the countries have considerable differences in their corruption rates as well as in the measures they use to battle and control corruption. In general, the literature on the subject of corruption and PPP suggests some ambiguous results. Indeed, measuring corruption with precision is not an easy task. Furthermore, when both partners, the public and the private, are corrupt or when nepotism is common practice, some projects might be launched, and investments are undertaken, while investments' productivity might be compromised (Spiller, 2008).

4.2.5.3. Regulatory Quality

The study found a significant positive relationship between regulatory quality and GDP per capita, meaning that sound regulatory quality in a country will positively affect its GDP per capita and hence economic growth.

While when exploring the effect of regulatory quality on PPP investments. The previous literature considers regulatory systems as one of the main frameworks for PPP success

(Pongsiri, 2002). Indeed, this study was able to prove significant relationship between regulatory quality and PPP investments, clear regulatory frameworks provided by governments encourages private investors to invest in public facilities guaranteeing their protection and operation efficiency (Baker N. B., 2016).

4.2.5.4. Government Effectiveness

Government effectiveness is another indicator of institutional quality. This study found a significant positive relationship between government effectiveness and GDP per capita, meaning that improved government effectiveness will increase GDP per capita hence economic growth.

When exploring the relationship between government effectiveness and PPPs, the previous literature emphasizes the importance of government effectiveness in attracting international donations (Best & Burke, 2017). This study found non-significant results meaning that it failed to prove that government effectiveness in developing countries will impact PPP investments, the results could be due to different country standings within the developing countries and fluctuations in the level of efficiency within economies.

4.2.5.5. Voice and Accountability

Voice and accountability is another indicator of institutional quality. The results in this study showed non-significant outcomes both in the impact of voice and accountability of GDP per capita as well as on PPP investments. Meaning that voice and accountability in developing countries doesn't affect PPP nor economic growth. More sophisticated data on different regimes in different countries may lead to different results. It is beyond the scope of this study and may be investigated in further research.

4.2.5.6. Rule of Law

The last indicator in the institutional quality is the rule of law. Previous literature considers the rule of law an essential indicator in PPP success, but also considered over regulations a reason behind failure of PPPs (Walker & Smith, 1995).

The results of this study showed a significant relationship between the rule of law and GDP per capita, hence economic growth in developing countries, meaning that proper rule of law in the country leads to economic growth. While the study found non-significant results when trying to find a positive relationship between rule of law and PPP investments. This results could be explained by the fact that domestic rules within each country do not affect the attractiveness of foreign infrastructure investment contracts since disputes are subject to international law (Baker N. B., 2016).

CHAPTER 5: IMPLICATION AND LIMITATION OF THE STUDY

5.1. Implications of the Study

5.1.1. Research Implications

The primary goal of this study was to explore the direct impact of public private partnerships investments in infrastructure on GDP in developing countries, and their indirect effect on the different components of production such as investments other than infrastructure investments, employment rate, human development index and institutional quality.

Different growth theories suggested the variables chosen in this study: Solow's production function, which takes into account labor and capital as factors of production, Lucas's endogenous growth with human capital as an important factor of economic growth, and North and Romer's approach with an emphasis on institutional quality as an important component of economic growth. The model developed on the basis of these theoretical views tried to study the impact of PPP investments in infrastructure on GDP and their marginal impact on each of the above mentioned components of GDP in developing countries.

Although there have been studies tackling the importance of public private partnerships, my contribution lies in the fact that I have targeted the developing world as a whole and studied both the direct and indirect impact of private participation in infrastructure on GDP. In this regard, the results of my study can be applied on the 81 developing countries in our sample.

In order to build the infrastructure in countries with crippling budget deficits; such as to avoid the opportunity cost linked to the lack of quality public services, it is recommended to involve the private sector as a partner in the venture. Indeed, PPPs rally the control of the public sector and the efficiency of private firms.

PPPs are recommended to further enhance the productivity of labor, new job opportunities and the improvement of human capital.

They are also recommended to be used as a tool to drive further investments in other sectors of the economy and hence magnify the multiplier effect of investments in GDP.

Literature suggests that institutional quality is capital for the success of PPP, therefore legislative and regulatory framework is a basis for attracting private investments.

5.1.2. Theoretical Implications

This study has important theoretical implications anchored in different theories of economic growth and public management. The model reflects the importance of Public Private Partnerships as a new tool for successful management of public services through their direct impact on GDP and indirect impact on the marginal effect of other factors such as labor, other investments, human development index. It also reflects the importance of the existence of sound institutions for the success of public private partnerships.

The results from the model confirm that, first, Public Private Partnerships have a direct positive impact on the GDP in developing countries indeed. Second, investment in Public Private Partnerships has an indirect effect on GDP through their positive effect on the marginal impact of other aggregates in the economy such as labor and other investments. Third, the human development Index was found to impact GDP positively but failed to prove the immediate impact of PPP investments on it. And lastly, the results showed that

from the six institutional indicators, regulatory quality has a positive effect on the public private partnership investments hence GDP and the other five indicators: political stability, control of corruption, government effectiveness, voice and accountability and the rule of law do not have an impact.

The study can be considered a basis for future research on PPP investment in the developing world and results may be refined by separating the countries into different groups according to their income classification.

5.1.3. Policy Implications

The result of the study could be used to derive policy implications for developing countries:

- Public Private Partnerships were found to have a direct positive impact on GDP in developing countries. Hence, developing countries could use public private partnership agreements in developing their infrastructures and thus positively impact their economic growth and social welfare.
- Public private partnerships were found to impact marginally the ratio of employment to population in developing countries and enhance their positive marginal impact on GDP. Hence, developing countries could use public private partnerships as a means to improve employment rates in the long run.
- Public private partnerships were found to increase the investments in other sectors. Hence, developing countries could use public private partnership agreements in infrastructure to energize other industries in the economy and positively impact the GDP of the country.
- Control of Corruption, Government Effectiveness, Regulatory Quality and Rule of Law were found to impact the GDP per capita positively. Hence, developing

countries could focus more on the mentioned governance indicators to improve overall economic standing through better laws and regulations.

- Regulatory quality was found to impact the marginal effect of public private investments on GDP positively. Thus, sound regulatory quality in developing countries is a basis for attracting private investments and realize successful projects.

5.2. Limitations of the study

The data was collected from secondary data resources, and any future changes in these sources are not reflected in the study. It is conducted on a period that extends from 2000 to 2016, and the results only indicate the mentioned timeframe.

From the 125 developing countries mentioned in the PPI World Bank database, only 81 were considered in the study because of missing information. We chose to work on a balanced panel for accuracy considerations.

It is important to note that the developing world has a broad and diverse range of countries and they differ in their income groups, poverty rates and development indexes, which might have affected the results in some cases.

There is a concentration of projects in some countries while in others very few projects were conducted in the form of PPP. Experience from past projects had a substantial effect on the attractiveness of private participation and was not measured in this study.

Panel data frequently suffer from some cross section dependency and serial correlation. The data under study have shown a high level of serial correlation, which was controlled using the Arellano method, as suggested in the econometric literature. Indeed, serial correlation is a more serious problem when the panel includes a small number of countries and a large number of years, which is not the case in our sample.

The types of the PPPs were not considered in the model and could be interesting to include in future researches, to see the impact of the magnitude of the private sector involvement on the GDP.

It would have been interesting to compare the performance of PPPs in the developed countries to that in the developing countries. However, when available, data in the developed countries are not harmoniously measured.

CONCLUSION

Infrastructure is the main building block for a strong economy. Governments in the developing world strive to develop quality infrastructure to provide better services to their citizens and improve their quality of life. The international community has seen in Public Private Partnerships mean to provide quality infrastructure specially in developing countries, who have high budget deficits and lack resources to develop it themselves.

This paper considered 81 developing countries over the course of 17 years from 2000-2016, to explore the direct and indirect impact of Public Private Partnerships in infrastructure on the GDP in developing countries, taking different components as other investments, employment, human capital, and institutional quality.

The study was able to prove the direct impact of public private partnerships in infrastructure on the GDP per capita. It also succeeded to prove the marginal impact of PPPs on job creation and improvement of the human development index.

The study also focused on the impact of institutional quality on the public private partnerships and hence on GDP, considering the six world governance indicators and their direct impact on GDP per capita and indirectly through an increase of PPP investments.

Thus, this research provides substantial evidence that public private partnerships can be used as an effective tool to improve the GDP per capita of a country in the developing world and provide job creation and human capital development opportunities in the long run. It also, provides evidence of the importance of each of control of corruption, regulatory quality, government effectiveness and rule of law from the 6 world governance indicators in impacting positively GDP per capita in the developing world. Further, it provides evidence on the importance of regulatory quality of a country in positively impacting public private partnership investments and marginally impacting GDP per capita of the country.

This study can be considered as a basis for future research on PPP investment in the developing world and provide important insight into different components and their effect on the economic growth of the developing countries.

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APPENDIX 1: LIST OF DEVELOPING COUNTRIES CONSIDERED IN THE THESIS

Albania
Algeria
Angola
Argentina
Armenia
Azerbaijan
Bangladesh
Belarus
Belize
Benin
Bhutan
Bolivia
Bosnia and Herzegovina
Botswana
Brazil
Bulgaria
Burkina Faso
Cambodia
Cameroon
Chad
China
Colombia
Comoros
Congo, Dem. Rep.
Congo, Rep.
Costa Rica
Cote d'Ivoire
Gabon
Georgia
Ghana
Guatemala
Guinea
Haiti
Honduras
India
Indonesia
Iran, Islamic Rep.
Jamaica
Jordan
Kazakhstan
Kenya
Kyrgyz Republic
Lebanon
Macedonia, FYR
Madagascar
Malawi
Malaysia
Mali
Mauritania
Mauritius
Mexico
Moldova
Mongolia
Morocco
Mozambique
Namibia
Nepal
Nicaragua
Niger
Nigeria
Pakistan
Panama
Peru
Philippines
Romania
Russian Federation
Rwanda
Senegal
Serbia
Sierra Leone
Sudan
Tanzania
Thailand
Tunisia
Turkey
Uganda
Ukraine
Uzbekistan
Vietnam
Yemen, Rep.
Zimbabwe

APPENDIX 2: AUGMENTED DICKEY-FULLER TEST

Data	Dickey-Fuller	Lag Order	P-Value	Alternative Hypothesis
GDP	-6.6727	1	0.01	Stationary
IPPP	-18.724	1	0.01	Stationary
K	-8.9638	1	0.01	Stationary
Labor	-6.7109	1	0.01	Stationary
HDI	-6.8225	1	0.01	Stationary
Political Stability	-7.7724	1	0.01	Stationary
Control of Corruption	-7.0266	1	0.01	Stationary
Regulatory Quality	-6.3926	1	0.01	Stationary
Government Effectiveness	-6.7506	1	0.01	Stationary
Voice and Accountability	-6.8471	1	0.01	Stationary
Rule of Law	-6.616	1	0.01	Stationary

APPENDIX 3: PANEL REGRESSION ANALYSIS

Model 1-Equation 1

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-2.3231e+03	3.3636e+02	-6.9065	7.581e-12	***
IPPP	3.8621e+00	7.8675e-01	4.9089	1.026e-06	***
K	2.2055e+00	6.3062e-02	34.9743	< 2.2e-16	***
L	-9.4260e+00	3.1415e+00	-3.0005	0.002745	**
HDI	6.9469e+03	3.9468e+02	17.6011	< 2.2e-16	***
IQ1	1.0899e+02	4.8378e+01	2.2528	0.024429	*
IPPPxK	5.6959e-01	9.2558e-02	6.1539	9.909e-10	***

Coefficients for fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.0890e+00	2.4567e-01	4.4329	1.009e-05	***
K	1.0899e+00	2.7285e-02	39.9459	< 2.2e-16	***
L	2.0204e+01	4.8633e+00	4.1544	3.476e-05	***
HDI	5.5681e+03	3.9798e+02	13.9908	< 2.2e-16	***
IQ1	4.5801e+01	3.0046e+01	1.5243	0.12767	
IPPPxK	6.3519e-02	3.0245e-02	2.1002	0.03591	*

Coefficients for the random effect:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.9155e+03	3.7465e+02	-5.1127	3.626e-07	***
IPPP	1.1216e+00	2.5735e-01	4.3582	1.409e-05	***
K	1.0992e+00	2.8327e-02	38.8055	< 2.2e-16	***
L	7.9494e+00	4.5216e+00	1.7581	0.078956	.
HDI	6.5200e+03	3.8950e+02	16.7393	< 2.2e-16	***
IQ1	5.7867e+01	3.1026e+01	1.8651	0.062379	.
IPPPxK	9.8261e-02	3.1373e-02	3.1320	0.001773	**

Model 1-Equation 2

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.8885e+03	3.3305e+02	-5.6704	1.735e-08	***
IPPP	3.5901e+00	8.0835e-01	4.4412	9.663e-06	***
K	2.1566e+00	6.3148e-02	34.1514	< 2.2e-16	***
L	-1.0208e+01	3.1662e+00	-3.2241	0.001293	**
HDI	7.0182e+03	3.9760e+02	17.6515	< 2.2e-16	***
IQ1	1.1413e+02	4.8821e+01	2.3377	0.019546	*
IPPPxL	3.0868e-02	7.8076e-03	3.9536	8.092e-05	***

Coefficients for fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.5372e-01	2.4920e-01	3.8271	0.0001359	***
K	1.0932e+00	2.7225e-02	40.1553	< 2.2e-16	***
L	2.1134e+01	4.8576e+00	4.3508	1.463e-05	***
HDI	5.1818e+03	3.7506e+02	13.8160	< 2.2e-16	***
IQ1	4.3715e+01	2.9959e+01	1.4592	0.1447671	
IPPPxL	8.6543e-03	2.4541e-03	3.5265	0.0004358	***

Coefficients for the random effect:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5791e+03	3.5936e+02	-4.3943	1.197e-05	***
IPPP	1.0204e+00	2.6184e-01	3.8972	0.000102	***
K	1.0996e+00	2.8333e-02	38.8086	< 2.2e-16	***
L	8.0481e+00	4.5226e+00	1.7795	0.075378	.
HDI	6.0610e+03	3.7150e+02	16.3151	< 2.2e-16	***
IQ1	5.6531e+01	3.1032e+01	1.8217	0.068718	.
IPPPxL	8.1470e-03	2.5761e-03	3.1625	0.001599	**

Model 1-Equation 3

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.9338e+03	3.3119e+02	-5.8389	6.552e-09	***
IPPP	2.8758e+00	8.2623e-01	3.4807	0.0005159	***
K	2.1572e+00	6.2822e-02	34.3376	< 2.2e-16	***
L	-1.0033e+01	3.1494e+00	-3.1858	0.0014763	**
HDI	7.0783e+03	3.9564e+02	17.8908	< 2.2e-16	***
IQ1	1.2835e+02	4.8709e+01	2.6350	0.0085098	**
IPPPxHDI	2.0812e+00	3.8111e-01	5.4608	5.622e-08	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.5712e-01	2.5459e-01	3.7595	0.0001779	***
K	1.0895e+00	2.7255e-02	39.9750	< 2.2e-16	***
L	1.9410e+01	4.8661e+00	3.9887	7.017e-05	***
HDI	5.3406e+03	3.7536e+02	14.2277	< 2.2e-16	***
IQ1	4.7010e+01	3.0031e+01	1.5654	0.1177429	
IPPPxHDI	2.9453e-01	1.1947e-01	2.4654	0.0138146	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5814e+03	3.5924e+02	-4.4022	1.155e-05	***
IPPP	9.8052e-01	2.6770e-01	3.6628	0.000259	***
K	1.0971e+00	2.8372e-02	38.6681	< 2.2e-16	***
L	6.5117e+00	4.5190e+00	1.4409	0.149828	
HDI	6.2166e+03	3.7144e+02	16.7364	< 2.2e-16	***
IQ1	6.0131e+01	3.1107e+01	1.9331	0.053435	.
IPPPxHDI	3.5132e-01	1.2550e-01	2.7993	0.005193	**

Model 1-Equation 4

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.9330e+03	3.3543e+02	-5.7627	1.021e-08	***
IPPP	4.2468e+00	8.0116e-01	5.3008	1.342e-07	***
K	2.1606e+00	6.3500e-02	34.0256	< 2.2e-16	***
L	-9.9199e+00	3.1882e+00	-3.1115	0.0019	**
HDI	7.0373e+03	4.0041e+02	17.5753	< 2.2e-16	***
IQ1	1.0436e+02	4.9037e+01	2.1282	0.0335	*
IPPPxIQ1	-7.2323e-03	5.0934e-02	-0.1420	0.8871	

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.097706	0.246933	4.4454	9.528e-06	***
K	1.088808	0.027321	39.8528	< 2.2e-16	***
L	20.195750	4.870754	4.1463	3.599e-05	***
HDI	5274.36770	375.675148	14.0397	< 2.2e-16	***
IQ1	45.304307	30.086301	1.5058	0.1324	
IPPPxIQ1	-0.016959	0.015335	-1.1059	0.2690	

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5839e+03	3.6043e+02	-4.3944	1.197e-05	***
IPPP	1.1579e+00	2.5939e-01	4.4637	8.716e-06	***
K	1.0956e+00	2.8421e-02	38.5470	< 2.2e-16	***
L	7.3329e+00	4.5316e+00	1.6182	0.10586	
HDI	6.1421e+03	3.7197e+02	16.5121	< 2.2e-16	***
IQ1	5.7988e+01	3.1149e+01	1.8616	0.06287	.
IPPPxIQ1	-1.5027e-02	1.6112e-02	-0.9327	0.35116	

Model 2-Equation 1

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-2.1527e+03	3.3429e+02	-6.4396	1.653e-10	***
IPPP	3.6307e+00	7.8635e-01	4.6171	4.256e-06	***
K	2.1835e+00	6.3114e-2	34.5959	< 2.2e-16	***
L	-8.7470e+00	3.0931e+00	-2.8280	0.004753	**
HDI	6.8386e+03	3.9241e+02	17.4274	< 2.2e-16	***
IQ2	3.0899e+02	7.5637e+01	4.0852	4.660e-05	***
IPPPxK	5.5852e-01	9.2179e-02	6.0591	1.766e-09	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.1003e+00	2.4454e-01	4.4995	7.426e-06	***
K	1.0874e+00	2.7164e-02	40.0304	< 2.2e-16	***
L	2.0727e+01	4.8433e+00	4.2795	2.011e-05	***
HDI	5.5048e+03	3.9652e+02	13.8827	< 2.2e-16	***
IQ2	2.2690e+02	6.1657e+01	3.6800	0.0002429	***
IPPPxK	6.2305e-02	3.0116e-2	2.0688	0.0387594	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7766e+03	3.7415e+02	-4.7484	2.266e-06	***
IPPP	1.1333e+00	2.5579e-01	4.4308	1.014e-05	***
K	1.0961e+00	2.8159e-02	38.9257	< 2.2e-16	***
L	8.7297e+00	4.5004e+00	1.9398	0.052611	*
HDI	6.4200e+03	3.8796e+02	16.5482	< 2.2e-16	***
IQ2	2.6680e+02	6.2691e+01	4.2558	2.225e-05	***
IPPPxK	9.5797e-02	3.1198e-02	3.0706	0.002178	**

Model 2-Equation 2

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7137e+03	3.3004e+02	-5.1925	2.388e-07	***
IPPP	3.3354e+00	8.0768e-01	4.1296	3.853e-05	***
K	2.1340e+00	6.3141e-02	33.7980	< 2.2e-16	***
L	-9.4905e+00	3.1152e+00	-3.0465	0.002359	**
HDI	6.9002e+03	3.9518e+02	17.4609	< 2.2e-16	***
IQ2	3.2718e+02	7.6219e+01	4.2926	1.890e-05	***
IPPPxL	3.0896e-02	7.7643e-03	3.9792	7.276e-05	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	96337e-01	2.4805e-01	3.8837	0.0001081	***
K	1.0908e+00	2.7101e-02	40.2483	< 2.2e-16	***
L	2.1660e+01	4.8370e+00	4.4779	8.203e-06	***
HDI	5.1219e+03	3.7359e+02	13.7100	< 2.2e-16	***
IQ2	2.2712e+02	6.1457e+01	3.6956	0.0002285	***
IPPPxL	8.6765e-03	2.4428e-03	3.5519	0.0003962	***

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.4447e+03	3.5872e+02	-4.0274	5.950e-05	***
IPPP	1.0293e+00	2.6020e-01	3.9557	8.021e-05	***
K	1.0966e+00	2.8159e-02	38.9444	< 2.2e-16	***
L	8.8595e+00	4.5005e+00	1.9685	0.04921	*
HDI	5.9665e+03	3.6983e+02	16.1330	< 2.2e-16	***
IQ2	2.6974e+02	6.2666e+01	4.3044	1.793e-05	***
IPPPxL	8.1955e-03	2.5601e-3	3.2012	0.00140	**

Model 2-Equation 3

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7970e+03	3.2868e+02	-5.4675	5.417e-08	***
IPPP	2.7006e+00	8.2473e-01	3.2746	0.001085	**
K	2.1374e+00	6.2864e-02	34.0005	< 2.2e-16	***
L	-9.1692e+00	3.1017e+00	-2.9562	0.003168	**
HDI	6.9842e+03	3.9374e+02	17.7380	< 2.2e-16	***
IQ2	3.1845e+02	7.5864e+01	4.1976	2.871e-05	***
IPPPxHDI	1.9904e+00	3.7810e-01	5.2641	1.634e-07	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.6000e-01	2.5333e-01	3.7895	0.0001579	***
K	1.0870e+00	2.7125e-02	40.0751	< 2.2e-16	***
L	1.9924e+01	4.8445e+00	4.1126	4.159e-05	***
HDI	5.2830e+03	3.7377e+02	14.1343	< 2.2e-16	***
IQ2	2.3414e+02	6.1638e+01	3.7986	0.0001523	***
IPPPxHDI	3.0803e-01	1.1898e-01	2.5889	0.0097363	**

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.4446e+03	3.5847e+02	-4.0300	5.885e-05	***
IPPP	9.8277e-01	2.6599e-01	3.6948	0.0002287	***
K	1.0941e+00	2.8195e-02	38.8048	< 2.2e-16	***
L	7.2930e+00	4.4953e+00	1.6224	0.1049534	
HDI	6.1255e+03	3.6967e+02	16.5702	< 2.2e-16	***
IQ2	2.7786e+02	6.2822e+01	4.4229	1.051e-05	***
IPPPxHDI	3.6550e-01	1.2480e-01	2.9288	0.0034588	**

Model 2-Equation 4

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7384e+03	3.3150e+02	-5.2440	1.818e-07	***
IPPP	3.8235e+00	8.0053e-01	4.7762	1.978e-06	***
K	2.1351e+00	6.3447e-02	33.6517	< 2.2e-16	***
L	-9.4380e+00	3.1302e+00	-3.0152	0.002616	**
HDI	6.9170e+03	3.9703e+02	17.4217	< 2.2e-16	***
IQ2	3.2087e+02	7.6554e+01	4.1914	2.950e-05	***
IPPPxIQ2	-1.9222e-01	1.1030e-01	-1.7427	0.081608	.

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.073853	0.246015	4.3650	1.373e-05	***
K	1.083207	0.027154	39.8911	< 2.2e-16	***
L	20.885596	4.845685	4.3101	1.756e-05	***
HDI	5212.785872	373.675410	13.9500	< 2.2e-16	***
IQ2	226.680844	61.663158	3.6761	0.0002465	***
IPPPxIQ2	-0.065805	0.032589	-2.0193	0.0436654	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.4450e+03	3.5874e+02	-4.0281	5.932e-05	***
IPPP	1.1390e+00	2.5912e-01	4.3956	1.190e-05	***
K	1.0902e+00	2.8313e-02	38.5071	< 2.2e-16	***
L	7.6858e+00	4.4961e+00	1.7095	0.08759	.
HDI	6.0879e+03	3.7026e+02	16.4422	< 2.2e-16	***
IQ2	2.7178e+02	6.3006e+01	4.3135	1.722e-05	***
IPPPxIQ2	-6.0007e-02	3.4335e-02	-1.7477	0.08074	.

Model 3-Equation 1

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7169e+03	3.4001e+02	-5.0495	5.025e-07	***
IPPP	3.0974e+00	7.8482e-01	3.9466	8.330e-05	***
K	2.1875e+00	6.2050e-02	35.2538	< 2.2e-16	***
L	-9.8838e+00	3.0687e+00	-3.2208	0.001308	**
HDI	6.2741e+03	4.0242e+02	15.5911	< 2.2e-16	***
IQ3	4.8169e+02	7.1613e+01	6.7264	2.548e-11	***
IPPPxK	5.3777e-01	9.1323e-02	5.8886	4.893e-09	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.4296e-01	2.3608e-01	3.9943	6.855e-05	***
K	1.0772e+00	2.6194e-02	41.1225	< 2.2e-16	***
L	2.1641e+01	4.6672e+00	4.6368	3.897e-06	***
HDI	5.2383e+03	3.8274e+02	13.6864	< 2.2e-16	***
IQ3	5.7176e+02	5.3552e+01	10.6766	< 2.2e-16	***
IPPPxK	5.9778e-02	2.9019e-02	2.0600	0.0396	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5405e+03	3.6157e+02	-4.2606	2.178e-05	***
IPPP	9.6299e-01	2.4621e-01	3.9113	9.630e-05	***
K	1.0863e+00	2.7085e-02	40.1084	< 2.2e-16	***
L	1.0303e+01	4.3574e+00	2.3644	0.01820	*
HDI	6.0294e+03	3.7554e+02	16.0551	< 2.2e-16	***
IQ3	5.9471e+02	5.4515e+01	10.9090	< 2.2e-16	***
IPPPxK	8.8836e-02	2.9993e-02	2.9619	0.00311	**

Model 3-Equation 2

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5405e+03	3.6157e+02	-4.2606	2.178e-05	***
IPPP	9.6299e-01	2.4621e-01	3.9113	9.630e-05	***
K	1.0863e+00	2.7085e-02	40.1084	< 2.2e-16	***
L	1.0303e+01	4.3574e+00	2.3644	0.01820	*
HDI	6.0294e+03	3.7554e+02	16.0551	< 2.2e-16	***
IQ3	5.9471e+02	5.4515e+01	10.9090	< 2.2e-16	***
IPPPxL	8.8836e-02	2.9993e-02	2.9619	0.00311	**

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	7.9921e-01	2.3933e-01	3.3394	0.0008636	***
K	1.0807e+00	2.6115e-02	41.3836	< 2.2e-16	***
L	2.2614e+01	4.6581e+00	4.8547	1.353e-06	***
HDI	4.8623e+03	3.6042e+02	13.4907	< 2.2e-16	***
IQ3	5.7443e+02	5.3343e+01	10.7687	< 2.2e-16	***
IPPPxL	8.8940e-03	2.3522e-03	3.7811	0.0001633	***

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2299e+03	3.4643e+02	-3.5501	0.0003981	***
IPPP	8.4705e-01	2.5027e-01	3.3845	0.0007332	***
K	1.0874e+00	2.7061e-02	40.1826	< 2.2e-16	***
L	1.0549e+01	4.3547e+00	2.4224	0.0155472	*
HDI	5.5923e+03	3.5751e+02	15.6422	< 2.2e-16	***
IQ3	5.9981e+02	5.4444e+01	11.0170	< 2.2e-16	***
IPPPxL	8.4769e-03	2.4575e-03	3.4493	0.0005790	***

Model 3-Equation 3

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.3607e+03	3.3371e+02	-4.0776	4.813e-05	***
IPPP	2.1521e+00	8.2193e-01	2.6184	0.0089329	**
K	2.1432e+00	6.1753e-02	34.7062	< 2.2e-16	***
L	-1.0324e+01	3.0750e+00	-3.3576	0.0008079	***
HDI	6.3968e+03	4.0366e+02	15.8469	< 2.2e-16	***
IQ3	4.9737e+02	7.1721e+01	6.9349	6.248e-12	***
IPPPxHDI	1.9635e+00	3.7404e-01	5.2494	1.767e-07	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	0.81207	0.24456	3.3206	0.0009235	***
K	1.07682	0.02616	41.1627	< 2.2e-16	***
L	20.87371	4.66914	4.4706	8.486e-06	***
HDI	5026.48465	360.90976	13.9273	< 2.2e-16	***
IQ3	572.77383	53.50528	10.7050	< 2.2e-16	***
IPPPxHDI	0.28861	0.11458	2.5188	0.0118952	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2348e+03	3.4643e+02	-3.5644	0.0003771	***
IPPP	8.2280e-01	2.5597e-01	3.2145	0.0013373	**
K	1.0845e+00	2.7118e-02	39.9930	< 2.2e-16	***
L	8.9467e+00	4.3536e+00	2.0550	0.0400685	*
HDI	5.7547e+03	3.5771e+02	16.0878	< 2.2e-16	***
IQ3	5.9838e+02	5.4599e+01	10.9595	< 2.2e-16	***
IPPPxHDI	3.3788e-01	1.1982e-01	2.8199	0.0048735	**

Model 3-Equation 4

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2866e+03	3.3689e+02	-3.8189	0.000140	***
IPPP	3.4496e+00	7.9210e-01	4.3550	1.430e-05	***
K	2.1451e+00	6.2342e-02	34.4084	< 2.2e-16	***
L	-1.0469e+01	3.1035e+00	-3.3731	0.000764	***
HDI	6.2901e+03	4.0762e+02	15.4314	< 2.2e-16	***
IQ3	5.0992e+02	7.2663e+01	7.0176	3.539e-12	***
IPPPxIQ3	1.3085e-01	9.6636e-02	1.3540	0.175947	

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.9341e-01	2.3450e-01	4.2363	2.434e-05	***
K	1.0777e+00	2.6084e-02	41.3154	< 2.2e-16	***
L	2.2493e+01	4.6572e+00	4.8297	1.531e-06	***
HDI	4.8858e+03	3.6005e+02	13.5698	< 2.2e-16	***
IQ3	6.2454e+02	5.5114e+01	11.3319	< 2.2e-16	***
IPPPxIQ3	1.0199e-01	2.7403e-02	3.7218	0.0002063	***

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2202e+03	3.4666e+02	-3.5198	0.0004460	***
IPPP	1.0319e+00	2.4489e-01	4.2138	2.676e-05	***
K	1.0847e+00	2.6996e-02	40.1807	< 2.2e-16	***
L	1.0714e+01	4.3563e+00	2.4595	0.0140366	*
HDI	5.5897e+03	3.5715e+02	15.6508	< 2.2e-16	***
IQ3	6.4639e+02	5.6106e+01	11.5209	< 2.2e-16	***
IPPPxIQ3	1.0072e-01	2.8584e-02	3.5238	0.0004394	***

Model 4-Equation 1

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7102e+03	3.6102e+02	-4.7371	2.393e-06	***
IPPP	3.6532e+00	7.8260e-01	4.6681	3.339e-06	***
K	2.1718e+00	6.3059e-02	34.4404	< 2.2e-16	***
L	-1.0453e+01	3.1120e+00	-3.3590	0.0008038	***
HDI	6.3201e+03	4.1689e+02	15.1599	< 2.2e-16	***
IQ4	4.0265e+02	8.1231e+01	4.9568	8.061e-07	***
IPPPxK	5.3291e-01	9.2146e-02	5.7834	9.058e-09	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.1089e+00	2.3649e-01	4.6889	3.038e-06	***
K	1.0548e+00	2.6480e-02	39.8339	< 2.2e-16	***
L	2.3119e+01	4.6906e+00	4.9287	9.354e-07	***
HDI	5.5261e+03	3.8267e+02	14.4407	< 2.2e-16	***
IQ4	5.8543e+02	5.7451e+01	10.1900	< 2.2e-16	***
IPPPxK	6.3234e-02	2.9122e-02	2.1713	0.03009	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7051e+03	3.6100e+02	-4.7233	2.559e-06	***
IPPP	1.1407e+00	2.4653e-01	4.6270	4.061e-06	***
K	1.0638e+00	2.7336e-02	38.9164	< 2.2e-16	***
L	1.1599e+01	4.3734e+00	2.6521	0.008092	**
HDI	6.2819e+03	3.7462e+02	16.7689	< 2.2e-16	***
IQ4	6.1558e+02	5.8342e+01	10.5513	< 2.2e-16	***
IPPPxK	9.0904e-02	3.0084e-02	3.0216	0.002561	**

Model 4-Equation 2

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2114e+03	3.5500e+02	-3.4125	0.0006624	***
IPPP	3.2992e+00	8.0300e-01	4.1086	4.217e-05	***
K	2.1208e+00	6.2928e-02	33.7024	< 2.2e-16	***
L	-1.1409e+01	3.1286e+00	-3.6467	0.0002756	***
HDI	6.2967e+03	4.1943e+02	15.0126	< 2.2e-16	***
IQ4	4.5223e+02	8.1575e+01	5.5438	3.547e-08	***
IPPPxL	3.1882e-02	7.7348e-03	4.1218	3.985e-05	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.7830e-01	2.3993e-01	4.0774	4.832e-05	***
K	1.0581e+00	2.6425e-02	40.0416	< 2.2e-16	***
L	2.3999e+01	4.6851e+00	5.1225	3.473e-07	***
HDI	5.1431e+03	3.6061e+02	14.2622	< 2.2e-16	***
IQ4	5.8273e+02	5.7282e+01	10.1730	< 2.2e-16	***
IPPPxL	8.3923e-03	2.3629e-03	3.5517	0.0003965	***

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.3912e+03	3.4611e+02	-4.0195	6.151e-05	***
IPPP	1.0377e+00	2.5072e-01	4.1390	3.701e-05	***
K	1.0645e+00	2.7329e-02	38.9492	< 2.2e-16	***
L	1.1776e+01	4.3733e+00	2.6927	0.007173	**
HDI	5.8460e+03	3.5685e+02	16.3822	< 2.2e-16	***
IQ4	6.1663e+02	5.8310e+01	10.5751	< 2.2e-16	***
IPPPxL	7.9791e-03	2.4671e-03	3.2342	0.001249	**

Model 4-Equation 3

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.3419e+03	3.5395e+02	-3.7913	0.0001564	***
IPPP	2.7431e+00	8.2009e-01	3.3449	0.0008455	***
K	2.1266e+00	6.2714e-02	33.9093	< 2.2e-16	***
L	-1.0947e+01	3.1181e+00	-3.5108	0.0004612	***
HDI	6.4281e+03	4.1845e+02	15.3617	< 2.2e-16	***
IQ4	4.2292e+02	8.1275e+01	5.2035	2.253e-07	***
IPPPxHDI	1.9238e+00	3.7704e-01	5.1024	3.825e-07	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.7621e-01	2.4503e-01	3.9841	7.154e-05	***
K	1.0543e+00	2.6447e-02	39.8654	< 2.2e-16	***
L	2.2328e+01	4.6928e+00	4.7578	2.178e-06	***
HDI	5.3009e+03	3.6084e+02	14.6903	< 2.2e-16	***
IQ4	5.8611e+02	5.7409e+01	10.2093	< 2.2e-16	***
IPPPxHDI	2.9595e-01	1.1501e-01	2.5733	0.01018	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.3922e+03	3.4588e+02	-4.0250	6.009e-05	***
IPPP	9.9908e-01	2.5634e-01	3.8974	0.0001019	***
K	1.0619e+00	2.7369e-02	38.7985	< 2.2e-16	***
L	1.0214e+01	4.3694e+00	2.3375	0.0195553	*
HDI	6.0011e+03	3.5684e+02	16.8176	< 2.2e-16	***
IQ4	6.1972e+02	5.8436e+01	10.6052	< 2.2e-16	***
IPPPxHDI	3.4478e-01	1.2022e-01	2.8680	0.0041940	**

Model 4-Equation 4

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2429e+03	3.5702e+02	-3.4814	0.0005144	***
IPPP	4.0236e+00	7.8947e-01	5.0966	3.941e-07	***
K	2.1242e+00	6.3267e-02	33.5758	< 2.2e-16	***
L	-1.1339e+01	3.1477e+00	-3.6024	0.0003265	***
HDI	6.3173e+03	4.2172e+02	14.9799	< 2.2e-16	***
IQ4	4.4041e+02	8.1971e+01	5.3727	9.103e-08	***
IPPPxIQ4	-1.9812e-01	1.4055e-01	-1.4096	0.1588898	

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.1370e+00	2.3592e-01	4.8196	1.609e-06	***
K	1.0535e+00	2.6472e-02	39.7962	< 2.2e-16	***
L	2.2701e+01	4.6935e+00	4.8367	1.479e-06	***
HDI	5.2540e+03	3.6066e+02	14.5679	< 2.2e-16	***
IQ4	5.9354e+02	5.7620e+01	10.3008	< 2.2e-16	***
IPPPxIQ4	8.1527e-02	4.2043e-02	1.9391	0.0527	.

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.3787e+03	3.4649e+02	-3.9789	7.286e-05	***
IPPP	1.1880e+00	2.4686e-01	4.8126	1.655e-06	***
K	1.0607e+00	2.7405e-02	38.7063	< 2.2e-16	***
L	1.0562e+01	4.3738e+00	2.4149	0.01587	*
HDI	5.9514e+03	3.5694e+02	16.6732	< 2.2e-16	***
IQ4	6.2742e+02	5.8660e+01	10.6959	< 2.2e-16	***
IPPPxIQ4	8.6813e-02	4.3980e-02	1.9739	0.04859	*

Model 5-Equation 1

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-2.0216e+03	3.2261e+02	-6.2663	4.941e-10	***
IPPP	3.1637e+00	7.7754e-01	4.0689	4.994e-05	***
K	2.2304e+00	6.1586e-02	36.2167	< 2.2e-16	***
L	-8.2219e+00	3.0452e+00	-2.6999	0.007021	**
HDI	6.5233e+03	3.8866e+02	16.7840	< 2.2e-16	***
IQ5	4.2539e+02	5.5303e+01	7.6920	2.753e-14	***
IPPPxK	5.6766e-01	9.0779e-02	6.2533	5.360e-10	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.099124	0.245739	4.4727	8.402e-06	***
K	1.086237	0.027446	39.5773	< 2.2e-16	***
L	19.808901	4.892572	4.0488	5.455e-05	***
HDI	5652.150745	400.991327	14.0954	< 2.2e-16	***
IQ5	-54.225427	57.088650	-0.9498	0.34237	
IPPPxK	0.062031	0.030300	2.0472	0.04084	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.9839e+03	3.7405e+02	-5.3039	1.320e-07	***
IPPP	1.1335e+00	2.5801e-01	4.3934	1.202e-05	***
K	1.0983e+00	2.8551e-02	38.4688	< 2.2e-16	***
L	7.9107e+00	4.5449e+00	1.7406	0.081985	.
HDI	6.5867e+03	3.9309e+02	16.7559	< 2.2e-16	***
IQ5	1.9011e+00	5.7311e+01	0.0332	0.973543	
IPPPxK	9.9192e-02	3.1485e-02	3.1504	0.001665	**

Model 5-Equation 2

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5739e+03	3.1850e+02	-4.9417	8.700e-07	***
IPPP	2.7820e+00	7.9902e-01	3.4818	0.0005137	***
K	2.1825e+00	6.1573e-02	35.4449	< 2.2e-16	***
L	-8.9655e+00	3.0647e+00	-2.9254	0.0034964	**
HDI	6.5765e+03	3.9111e+02	16.8151	< 2.2e-16	***
IQ5	4.4367e+02	5.5834e+01	7.9462	3.983e-15	***
IPPPxL	3.4523e-02	7.6608e-03	4.5065	7.153e-06	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	9.6148e-01	2.4926e-01	3.8573	0.0001203	***
K	1.0894e+00	2.7376e-02	39.7947	< 2.2e-16	***
L	2.0707e+01	4.8858e+00	4.2381	2.414e-05	***
HDI	5.2747e+03	3.7920e+02	13.9100	< 2.2e-16	***
IQ5	-5.8543e+01	5.6833e+01	-1.0301	0.3031671	
IPPPxL	8.7035e-03	2.4547e-03	3.5457	0.0004056	***

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.6451e+03	3.5900e+02	-4.5824	5.014e-06	***
IPPP	1.0320e+00	2.6273e-01	3.9280	8.991e-05	***
K	1.0984e+00	2.8570e-02	38.4466	< 2.2e-16	***
L	7.8465e+00	4.5431e+00	1.7271	0.08437	.
HDI	6.1378e+03	3.7628e+02	16.3121	< 2.2e-16	***
IQ5	-3.7766e+00	5.7274e+01	-0.0659	0.94744	
IPPPxL	8.2182e-03	2.5850e-03	3.1792	0.00151	**

Model 5-Equation 3

Coefficients for the pooled/OLS method:

	Estimate	Std. Error.	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.6820e+03	3.1793e+02	-5.2903	1.420e-07	***
IPPP	2.3338e+00	8.1535e-01	2.8624	0.004269	**
K	2.1845e+00	6.1452e-02	35.5477	< 2.2e-16	***
L	-8.6511e+00	3.0586e+00	-2.8284	0.004746	**
HDI	6.6890e+03	3.9066e+02	17.1224	< 2.2e-16	***
IQ5	4.1476e+02	5.5603e+01	7.4592	1.539e-13	***
IPPPxHDI	1.8920e+00	3.7326e-01	5.0688	4.551e-07	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	0.968463	0.254626	3.8035	0.0001494	***
K	1.085547	0.027408	39.6070	< 2.2e-16	***
L	18.976231	4.894649	3.8769	0.0001111	***
HDI	5437.470055	379.506655	14.3277	< 2.2e-16	***
IQ5	-59.994543	56.976952	-1.0530	0.2925558	
IPPPxHDI	0.291241	0.119511	2.4369	0.0149468	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.6537e+03	3.5907e+02	-4.6056	4.494e-06	***
IPPP	9.9556e-01	2.6840e-01	3.7093	0.0002161	***
K	1.0957e+00	2.8593e-02	38.3203	< 2.2e-16	***
L	6.4196e+00	4.5415e+00	1.4135	0.1577259	
HDI	6.2899e+03	3.7617e+02	16.7210	< 2.2e-16	***
IQ5	-4.4252e+00	5.7353e+01	-0.0772	0.9385101	
IPPPxHDI	3.4819e-01	1.2586e-01	2.7665	0.0057416	**

Model 5-Equation 4

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.6408e+03	3.2045e+02	-5.1203	3.486e-07	***
IPPP	3.2863e+00	7.9878e-01	4.1142	4.117e-05	***
K	2.1810e+00	6.1989e-02	35.1839	< 2.2e-16	***
L	-8.5522e+00	3.0858e+00	-2.7715	0.005656	**
HDI	6.6333e+03	3.9376e+02	16.8461	< 2.2e-16	***
IQ5	4.3090e+02	5.6116e+01	7.6787	3.041e-14	***
IPPPxIQ5	-2.5109e-01	1.3604e-01	-1.8457	0.065151	.

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.077786	0.250264	4.3066	1.783e-05	***
K	1.084675	0.027458	39.5025	< 2.2e-16	***
L	19.703379	4.897341	4.0233	6.073e-05	***
HDI	5375.296440	379.623114	14.1596	< 2.2e-16	***
IQ5	-63.606298	57.144038	-1.1131	0.2659	
IPPPxIQ5	-0.051911	0.042257	-1.2285	0.2195	

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.6574e+03	3.6043e+02	-4.5984	4.651e-06	***
IPPP	1.1416e+00	2.6315e-01	4.3382	1.542e-05	***
K	1.0939e+00	2.8594e-02	38.2552	< 2.2e-16	***
L	7.3618e+00	4.5559e+00	1.6159	0.1063	
HDI	6.2056e+03	3.7640e+02	16.4866	< 2.2e-16	***
IQ5	-9.2531e+00	5.7484e+01	-0.1610	0.8721	
IPPPxIQ5	-4.8050e-02	4.4434e-02	-1.0814	0.2797	

Model 6-Equation 1

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-2.1610e+03	3.3513e+02	-6.4484	1.563e-10	***
IPPP	3.6021e+00	7.8789e-01	4.5718	5.271e-06	***
K	2.1885e+00	6.3031e-02	34.7208	< 2.2e-16	***
L	-8.3685e+00	3.0931e+00	-2.7055	0.006904	**
HDI	6.7841e+03	3.9572e+02	17.1435	< 2.2e-16	***
IQ6	2.8882e+02	7.3986e+01	3.9037	9.932e-05	***
IPPPxK	5.6557e-01	9.2207e-02	6.1337	1.121e-09	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.0245e+00	2.4221e-01	4.2300	2.502e-05	***
K	1.0868e+00	2.6874e-02	40.4411	< 2.2e-16	***
L	2.3049e+01	4.8094e+00	4.7926	1.837e-06	***
HDI	5.1418e+03	3.9787e+02	12.9233	< 2.2e-16	***
IQ6	4.1156e+02	6.3725e+01	6.4584	1.496e-10	***
IPPPxK	6.0910e-02	2.9797e-02	2.0442	0.04114	*

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.5941e+03	3.7301e+02	-4.2736	2.056e-05	***
IPPP	1.0543e+00	2.5351e-01	4.1586	3.401e-05	***
K	1.0954e+00	2.7882e-02	39.2863	< 2.2e-16	***
L	1.0774e+01	4.4792e+00	2.4053	0.016289	*
HDI	6.0680e+03	3.9020e+02	15.5511	< 2.2e-16	***
IQ6	4.1938e+02	6.4660e+01	6.4859	1.229e-10	***
IPPPxK	9.4410e-02	3.0890e-02	3.0563	0.002284	**

Model 6-Equation 2

Coefficients for the pooled/OLS method

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.7038e+03	3.3133e+02	-5.1424	3.106e-07	***
IPPP	3.2630e+00	8.1002e-01	4.0283	5.926e-05	***
K	2.1376e+00	6.3065e-02	33.8950	< 2.2e-16	***
L	-9.1070e+00	3.1144e+00	-2.9242	0.00351	**
HDI	6.8333e+03	3.9843e+02	17.1504	< 2.2e-16	***
IQ6	3.1504e+02	7.4763e+01	4.2139	2.675e-05	***
IPPPxL	3.2592e-02	7.7883e-03	4.1847	3.038e-05	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	8.7193e-01	2.4556e-01	3.5508	0.0003979	***
K	1.0906e+00	2.6787e-02	40.7144	< 2.2e-16	***
L	2.4136e+01	4.7999e+00	5.0284	5.643e-07	***
HDI	4.7458e+03	3.7514e+02	12.6508	< 2.2e-16	***
IQ6	4.2215e+02	6.3500e+01	6.6481	4.372e-11	***
IPPPxL	9.3048e-03	2.4162e-03	3.8510	0.0001234	***

Coefficients for random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2584e+03	3.5757e+02	-3.5194	0.0004467	***
IPPP	9.3371e-01	2.5775e-01	3.6225	0.0003024	***
K	1.0963e+00	2.7856e-02	39.3571	< 2.2e-16	***
L	1.1067e+01	4.4775e+00	2.4716	0.0135703	*
HDI	5.5986e+03	3.7217e+02	15.0431	< 2.2e-16	***
IQ6	4.3063e+02	6.4624e+01	6.6636	3.86e-11	***
IPPPxL	8.8479e-03	2.5339e-03	3.4918	0.0004950	***

Model 6-Equation 3

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.8254e+03	3.3025e+02	-5.5275	3.885e-08	***
IPPP	2.7276e+00	8.2601e-01	3.3021	0.0009843	***
K	2.1441e+00	6.2849e-02	34.1148	< 2.2e-16	***
L	-8.7877e+00	3.1042e+00	-2.8309	0.0047100	**
HDI	6.9488e+03	3.9744e+02	17.4839	< 2.2e-16	***
IQ6	2.7811e+02	7.4317e+01	3.7422	0.0001899	***
IPPPxHDI	1.9473e+00	3.7877e-01	5.1409	3.130e-07	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	8.9482e-01	2.5094e-01	3.5658	0.000376	***
K	1.0864e+00	2.6842e-02	40.4745	< 2.2e-16	***
L	2.2285e+01	4.8120e+00	4.6311	4.004e-06	***
HDI	4.9243e+03	3.7561e+02	13.1103	< 2.2e-16	***
IQ6	4.1261e+02	6.3675e+01	6.4800	1.302e-10	***
IPPPxHDI	2.8801e-01	1.1766e-01	2.4477	0.014509	*

Coefficients for the random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2714e+03	3.5764e+02	-3.5549	0.0003910	***
IPPP	9.1631e-01	2.6371e-01	3.4747	0.0005274	***
K	1.0933e+00	2.7931e-02	39.1441	< 2.2e-16	***
L	9.3429e+00	4.4760e+00	2.0873	0.0370413	*
HDI	5.7789e+03	3.7232e+02	15.5211	< 2.2e-16	***
IQ6	4.2197e+02	6.4782e+01	6.5136	1.027e-10	***
IPPPxHDI	3.4182e-01	1.2354e-01	2.7669	0.0057347	**

Model 6-Equation 4

Coefficients for the pooled/OLS method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.6491e+03	3.3050e+02	-4.9898	6.819e-07	***
IPPP	3.9851e+00	7.8803e-01	5.0571	4.834e-07	***
K	2.1423e+00	6.2817e-02	34.1041	< 2.2e-16	***
L	-9.5869e+00	3.1050e+00	-3.0876	0.002059	**
HDI	6.7491e+03	3.9748e+02	16.9798	< 2.2e-16	***
IQ6	3.0499e+02	7.4299e+01	4.1049	4.284e-05	***
IPPPxIQ6	5.5139e-01	1.0444e-01	5.2794	1.505e-07	***

Coefficients for the fixed effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
IPPP	1.033197	0.241733	4.2741	2.060e-05	***
K	1.085263	0.026841	40.4331	< 2.2e-16	***
L	22.823095	4.807132	4.7478	2.287e-06	***
HDI	4871.489814	375.107511	12.9869	< 2.2e-16	***
IQ6	411.845695	63.698322	6.4656	1.428e-10	***
IPPPxIQ6	-0.076433	0.033685	-2.2691	0.02343	*

Coefficients for the random effect method:

	Estimate	Std. Error	t-value	Pr(>|t|)	Sig.
(Intercept)	-1.2535e+03	3.5713e+02	-3.5100	0.0004627	***
IPPP	1.0944e+00	2.5584e-01	4.2775	2.021e-05	***
K	1.0923e+00	2.8110e-02	38.8577	< 2.2e-16	***
L	8.9693e+00	4.4642e+00	2.0091	0.0447176	*
HDI	5.7892e+03	3.7297e+02	15.5219	< 2.2e-16	***
IQ6	4.2247e+02	6.5098e+01	6.4897	1.199e-10	***
IPPPxIQ6	-6.8635e-02	3.5636e-02	-1.9260	0.0543148	.

APPENDIX 4: F TEST FOR TESTING BETWEEN POOLED AND FIXED MODELS

Model	Ftest	Df1	Df2	p-value
y = IPPP+K+L+HDI+IQ1+(IPPPxK)	191.87	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxL)	196.52	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxHDI)	193.34	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxIQ1)	197.09	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxK)	191.92	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxL)	196.42	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxHDI)	193.65	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxIQ2)	197.40	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxK)	203.43	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxL)	208.12	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxHDI)	204.91	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxIQ3)	210.36	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxK)	205.08	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxL)	209.07	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxHDI)	206.58	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxIQ4)	212.03	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxK)	183.78	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxL)	187.79	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxHDI)	186.79	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxIQ5)	188.55	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxK)	196.64	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxL)	201.5	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxHDI)	198.65	80	1290	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxIQ6)	198.28	80	1290	< 2.2e-16

APPENDIX 5: HAUSMAN TEST FOR TESTING BETWEEN FIXED AND RANDOM EFFECTS

Model	Chi^2	Df	p-value
y = IPPP+K+L+HDI+IQ1+(IPPPxK)	210.53	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxL)	50.78	6	$3.27x10^{-9}$
y = IPPP+K+L+HDI +IQ1+(IPPPxHDI)	81.89	6	$1.45x10^{-15}$
y = IPPP+K+L+HDI +IQ1+(IPPPxIQ1)	72.96	6	$1.008x10^{-13}$
y = IPPP+K+L+HDI +IQ2+(IPPPxK)	146.27	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxL)	272.71	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxHDI)	610.93	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxIQ2)	423.6	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxK)	97.11	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxL)	4191.4	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxHDI)	558.93	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxIQ3)	342.61	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxK)	70.17	6	$3.757x10^{-13}$
y = IPPP+K+L+HDI +IQ4+(IPPPxL)	103.19	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxHDI)	96.65	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxIQ4)	100.2	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxK)	218.35	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxL)	837.92	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxHDI)	4777.6	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxIQ5)	14671	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxK)	192.6	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxL)	51.89	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxHDI)	88.13	6	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxIQ6)	24.28	6	< 2.2e-16

APPENDIX 6: BREUSCH-GODFREY/WOOLDRIDGE TEST FOR SERIAL CORRELATION IN PANEL MODELS

Model	Chi^2	Df	p-value
y = IPPP+K+L+HDI+IQ1+(IPPPxK)	809.84	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxL)	788.06	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxHDI)	792.83	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxIQ1)	802.18	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxK)	803.47	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxL)	783.52	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxHDI)	788.34	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxIQ2)	794.8	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxK)	747.83	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxL)	729.7	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxHDI)	736.56	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxIQ3)	745.92	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxK)	759.27	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxL)	747	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxHDI)	749.58	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxIQ4)	758.95	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxK)	807.6	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxL)	793.81	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxHDI)	798.98	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxIQ5)	806.36	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxK)	795.15	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxL)	777.35	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxHDI)	785.6	17	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxIQ6)	793	17	< 2.2e-16

APPENDIX 7: BREUSCH-PAGAN TEST FOR HETEROSCEDASTICITY

Model	BP	Df	p-value
y = IPPP+K+L+HDI+IQ1+(IPPPxK)	2058.6	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxL)	2045.8	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxHDI)	2030.5	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ1+(IPPPxIQ1)	2050.6	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxK)	2032.5	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxL)	2019.7	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxHDI)	2000.8	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ2+(IPPPxIQ2)	2020.2	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxK)	1818.5	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxL)	1773.8	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxHDI)	1767.3	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ3+(IPPPxIQ3)	1852.9	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxK)	1900.6	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxL)	1881.5	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxHDI)	1869	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ4+(IPPPxIQ4)	1913.1	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxK)	2072.1	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxL)	2027.4	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxHDI)	2020.9	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ5+(IPPPxIQ5)	2026	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxK)	2047.2	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxL)	2016	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxHDI)	2005.6	86	< 2.2e-16
y = IPPP+K+L+HDI +IQ6+(IPPPxIQ6)	2019.2	86	< 2.2e-16

APPENDIX 8: CONTROLLING FOR SERIAL CORRELATION AND HETEROSCEDASTICITY -ARELLANO TEST RESULTS

Model 1-equation 1

T test of Coefficients, testing for significance of model 1 with political stability considering the interactive variable IPPPxK.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.0890e+00	5.7621e-01	1.8900	0.05899	.
K	1.0899e+00	9.0522e-02	12.0407	< 2.2e-16	***
L	2.0204e+01	1.1302e+01	1.7877	0.07405	.
HDI	5.5681e+03	9.7960e+02	5.6841	1.625e-08	***
IQ1	4.5801e+01	6.5636e+01	0.6978	0.48543	
IPPPxK	6.3519e-02	2.9729e-02	2.1366	0.03282	*

Model 1-equation 2

T test of Coefficients, testing for significance of model 1 with political stability considering the interactive variable IPPPxL.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.5372e-01	4.1579e-01	2.2938	0.02196	*
K	1.0932e+00	9.1658e-02	11.9272	< 2.2e-16	***
L	2.1134e+01	1.1507e+01	1.8366	0.06650	.
HDI	5.1818e+03	9.3425e+02	5.5465	3.531e-08	***
IQ1	4.3715e+01	6.5519e+01	0.6672	0.50476	
IPPPxL	8.6543e-03	5.2620e-03	1.6447	0.10028	

Model 1-equation 3

T test of Coefficients, testing for significance of model 1 with political stability considering the interactive variable IPPPxHDI.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.5712e-01	4.1120e-01	2.3276	0.02009	*
K	1.0895e+00	9.1486e-02	11.9092	< 2.2e-16	***
L	1.9410e+01	1.1351e+01	1.7099	0.08753	.
HDI	5.3406e+03	9.5546e+02	5.5895	2.776e-08	***
IQ1	4.7010e+01	6.5076e+01	0.7224	0.47019	
IPPPxHDI	2.9453e-01	2.4474e-01	1.2035	0.22901	

Model 1-equation 4

T test of Coefficients, testing for significance of model 1 with political stability considering the interactive variable IPPPxIQ14.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.097706	0.492880	2.2271	0.02611	*
K	1.088808	0.091615	11.8846	< 2.2e-16	***
L	20.195750	11.463333	1.7618	0.07835	.
HDI	5274.367705	941.476448	5.6022	2.584e-08	***
IQ1	45.304307	66.287930	0.6834	0.49445	
IPPPxIQ1	-0.016959	0.034215	-0.4957	0.62021	

Model 2-equation 1

T test of Coefficients, testing for significance of model 2 with Control of Corruption considering the interactive variable IPPPxK.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.1003e+00	5.7204e-01	1.9235	0.05464	.
K	1.0874e+00	8.9656e-02	12.1284	< 2.2e-16	***
L	2.0727e+01	1.1410e+01	1.8165	0.06952	.
HDI	5.5048e+03	9.9028e+02	5.5588	3.298e-08	***
IQ2	2.2690e+02	1.2506e+02	1.8143	0.06986	.
IPPPxK	6.2305e-02	2.9745e-02	2.0946	0.03640	*

Model 2-equation 2

T test of Coefficients, testing for significance of model 2 with Control of Corruption considering the interactive variable IPPPxL.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.6337e-01	4.1759e-01	2.3070	0.02121	*
K	1.0908e+00	9.0728e-02	12.0225	< 2.2e-16	***
L	2.1660e+01	1.1611e+01	1.8655	0.06234	.
HDI	5.1219e+03	9.3843e+02	5.4580	5.769e-08	***
IQ2	2.2712e+02	1.2374e+02	1.8355	0.06667	.
IPPPxL	8.6765e-03	5.2570e-03	1.6505	0.09909	.

Model 2-equation 3

T test of Coefficients, testing for significance of model 2 with Control of Corruption considering the interactive variable IPPPxHDI.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.6000e-01	4.1021e-01	2.3403	0.01942	*
K	1.0870e+00	9.0561e-02	12.0034	< 2.2e-16	***
L	1.9924e+01	1.1464e+01	1.7380	0.08245	.
HDI	5.2830e+03	9.5950e+02	5.5060	4.424e-08	***
IQ2	2.3414e+02	1.2531e+02	1.8685	0.06191	.
IPPPxHDI	3.0803e-01	2.4991e-01	1.2325	0.21797	

Model 2-equation 4

T test of Coefficients, testing for significance of model 2 with Control of Corruption considering the interactive variable IPPPxIQ15.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.073853	0.516685	2.0784	0.03787	*
K	1.083207	0.090126	12.0188	< 2.2e-16	***
L	20.885596	11.614672	1.7982	0.07238	.
HDI	5212.785872	947.948087	5.4990	4.599e-08	***
IQ2	226.680844	124.009145	1.8279	0.06779	.
IPPPxIQ2	-0.065805	0.061046	-1.0780	0.28125	

Model 3-equation 1

T test of Coefficients, testing for significance of model 3 with Regulatory Quality considering the interactive variable IPPPxK.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.4296e-01	5.7754e-01	1.6327	0.1027755	
K	1.0772e+00	8.5080e-02	12.6607	< 2.2e-16	***
L	2.1641e+01	1.0387e+01	2.0836	0.0373975	*
HDI	5.2383e+03	9.3689e+02	5.5912	2.75e-08	***
IQ3	5.7176e+02	1.5484e+02	3.6924	0.0002314	***
IPPPxK	5.9778e-02	2.9236e-02	2.0446	0.0410924	*

Model 3-equation 2

T test of Coefficients, testing for significance of model 3 with Regulatory Quality considering the interactive variable IPPPxL.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	7.9921e-01	4.1746e-01	1.9144	0.0557839	.
K	1.0807e+00	8.6154e-02	12.5444	< 2.2e-16	***
L	2.2614e+01	1.0592e+01	2.1350	0.0329453	*
HDI	4.8623e+03	8.8262e+02	5.5090	4.353e-08	***
IQ3	5.7443e+02	1.5419e+02	3.7256	0.0002033	***
IPPPxL	8.8940e-03	5.3487e-03	1.6628	0.0965920	.

Model 3-equation 3

T test of Coefficients, testing for significance of model 3 with Regulatory Quality considering the interactive variable IPPPxHDI.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	8.1207e-01	4.1355e-01	1.9636	0.0497859	*
K	1.0768e+00	8.6048e-02	12.5141	< 2.2e-16	***
L	2.0874e+01	1.0450e+01	1.9975	0.0459776	*
HDI	5.0265e+03	9.0705e+02	5.5416	3.631e-08	***
IQ3	5.7277e+02	1.5478e+02	3.7007	0.0002241	***
IPPPxHDI	2.8861e-01	2.7096e-01	1.0651	0.2870200	

Model 3-equation 4

T test of Coefficients, testing for significance of model 3 with Regulatory Quality considering the interactive variable IPPPxIQ16.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.9341e-01	5.9133e-01	1.6800	0.093207	.
K	1.0777e+00	8.5604e-02	12.5889	< 2.2e-16	***
L	2.2493e+01	1.0508e+01	2.1406	0.032490	*
HDI	4.8858e+03	8.9146e+02	5.4807	5.089e-08	***
IQ3	6.2454e+02	1.5982e+02	3.9078	9.798e-05	***
IPPPxIQ3	1.0199e-01	3.6299e-02	2.8097	0.005033	**

Model 4-equation 1

T test of Coefficients, testing for significance of model 4 with Government Effectiveness considering the interactive variable IPPPxK.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.1089e+00	5.4167e-01	2.0472	0.04084	*
K	1.0548e+00	8.9104e-02	11.8377	< 2.2e-16	***
L	2.3119e+01	1.0802e+01	2.1402	0.03253	*
HDI	5.5261e+03	9.6555e+02	5.7232	1.298e-08	***
IQ4	5.8543e+02	1.3617e+02	4.2993	1.842e-05	***
IPPPxK	6.3234e-02	2.9201e-02	2.1655	0.03054	*

Model 4-equation 2

T test of Coefficients, testing for significance of model 4 with Government Effectiveness considering the interactive variable IPPPxL.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.7830e-01	3.9009e-01	2.5079	0.01227	*
K	1.0581e+00	9.0285e-02	11.7196	< 2.2e-16	***
L	2.3999e+01	1.0989e+01	2.1840	0.02914	*
HDI	5.1431e+03	9.1410e+02	5.6264	2.254e-08	***
IQ4	5.8273e+02	1.3580e+02	4.2911	1.911e-05	***
IPPPxL	8.3923e-03	5.1454e-03	1.6310	0.10313	

Model 4-equation 3

T test of Coefficients, testing for significance of model 4 with Government Effectiveness considering the interactive variable IPPPxHDI.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.7621e-01	3.8192e-01	2.5561	0.01070	*
K	1.0543e+00	9.0097e-02	11.7022	< 2.2e-16	***
L	2.2328e+01	1.0871e+01	2.0539	0.04019	*
HDI	5.3009e+03	9.3360e+02	5.6779	1.683e-08	***
IQ4	5.8611e+02	1.3575e+02	4.3175	1.699e-05	***
IPPPxHDI	2.9595e-01	2.3933e-01	1.2366	0.21646	

Model 4-equation 4

T test of Coefficients, testing for significance of model 4 with Government Effectiveness considering the interactive variable IPPPxIQ17.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.1370e+00	5.2833e-01	2.1521	0.03157	*
K	1.0535e+00	8.9939e-02	11.7131	< 2.2e-16	***
L	2.2701e+01	1.0896e+01	2.0834	0.03741	*
HDI	5.2540e+03	9.2582e+02	5.6750	1.711e-08	***
IQ4	5.9354e+02	1.3610e+02	4.3609	1.399e-05	***
IPPPxIQ4	8.1527e-02	5.3821e-02	1.5148	0.13007	

Model 5-equation 1

T test of Coefficients, testing for significance of model 5 with Voice and Accountability considering the interactive variable IPPPxK.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.099124	0.565249	1.9445	0.05205	.
K	1.086237	0.088567	12.2645	< 2.2e-16	***
L	19.808901	11.762642	1.6841	0.09241	.
HDI	5652.150745	995.796391	5.6760	1.701e-08	***
IQ5	-54.225427	134.411099	-0.4034	0.68670	
IPPPxK	0.062031	0.031005	2.0007	0.04564	*

Model 5-equation 2

T test of Coefficients, testing for significance of model 5 with Voice and Accountability considering the interactive variable IPPPxL.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	0.968463	0.404419	2.3947	0.01678	*
K	1.085547	0.089594	12.1163	< 2.2e-16	***
L	18.976231	11.864033	1.5995	0.10996	
HDI	5437.470055	981.367787	5.5407	3.648e-08	***
IQ5	-59.994543	133.515464	-0.4493	0.65326	
IPPPxL	0.291241	0.241892	1.2040	0.22881	

Model 5-equation 3

T test of Coefficients, testing for significance of model 5 with Voice and Accountability considering the interactive variable IPPPxHDI.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	9.6148e-01	4.0794e-01	2.3569	0.01858	*
K	1.0894e+00	8.9756e-02	12.1378	< 2.2e-16	***
L	2.0707e+01	1.1941e+01	1.7340	0.08315	.
HDI	5.2747e+03	9.6220e+02	5.4819	5.056e-08	***
IQ5	-5.8543e+01	1.3421e+02	-0.4362	0.66276	
IPPPxHDI	8.7035e-03	5.1620e-03	1.6861	0.09203	.

Model 5-equation 4

T test of Coefficients, testing for significance of model 5 with Voice and Accountability considering the interactive variable IPPPxIQ18.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.077786	0.459102	2.3476	0.01905	*
K	1.084675	0.089590	12.1071	< 2.2e-16	***
L	19.703379	11.912347	1.6540	0.09836	.
HDI	5375.296440	969.266436	5.5457	3.547e-08	***
IQ5	-63.606298	135.537031	-0.4693	0.63894	
IPPPxIQ5	-0.051911	0.114763	-0.4523	0.65110	

Model 6-equation 1

T test of Coefficients, testing for significance of model 6 with Rule of Law considering the interactive variable IPPPxK.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.0245e+00	5.9737e-01	1.7151	0.08657	.
K	1.0868e+00	8.7422e-02	12.4318	< 2.2e-16	***
L	2.3049e+01	1.0687e+01	2.1569	0.03120	*
HDI	5.1418e+03	9.7695e+02	5.2631	1.657e-07	***
IQ6	4.1156e+02	1.5686e+02	2.6237	0.00880	**
IPPPxK	6.0910e-02	2.9957e-02	2.0332	0.04223	*

Model 6-equation 2

T test of Coefficients, testing for significance of model 6 with Rule of Law considering the interactive variable IPPPxL.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	8.7193e-01	4.2899e-01	2.0325	0.042304	*
K	1.0906e+00	8.8449e-02	12.3305	< 2.2e-16	***
L	2.4136e+01	1.0853e+01	2.2239	0.026331	*
HDI	4.7458e+03	9.2480e+02	5.1317	3.311e-07	***
IQ6	4.2215e+02	1.5371e+02	2.7464	0.006109	**
IPPPxL	9.3048e-03	5.2618e-03	1.7684	0.077232	.

Model 6-equation 3

T test of Coefficients, testing for significance of model 6 with Rule of Law considering the interactive variable IPPPxHDI.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	8.9482e-01	4.2472e-01	2.1069	0.035321	*
K	1.0864e+00	8.8466e-02	12.2806	< 2.2e-16	***
L	2.2285e+01	1.0781e+01	2.0671	0.038923	*
HDI	4.9243e+03	9.5315e+02	5.1664	2.763e-07	***
IQ6	4.1261e+02	1.5562e+02	2.6514	0.008114	**
IPPPxHDI	2.8801e-01	2.7040e-01	1.0651	0.287014	

Model 6-equation 4

T test of Coefficients, testing for significance of model 6 with Rule of Law considering the interactive variable IPPPxIQ19.

	Estimate	Std.	Error	t-value	Pr(>|t|)
IPPP	1.033197	0.522992	1.9755	0.048419	*
K	1.085263	0.088126	12.3149	< 2.2e-16	***
L	22.823095	10.770680	2.1190	0.034281	*
HDI	4871.48981	939.051990	5.1877	2.471e-07	***
IQ6	411.845695	155.806635	2.6433	0.008309	**
IPPPxIQ6	-0.076433	0.069922	-1.0931	0.274544	
