

Shabbir, Aiza; Kousar, Shazia; Kousar, Farzana; Adeel, Amna; Jafar, Rana Adeel

Article

Investigating the effect of governance on unemployment: A case of South Asian countries

International Journal of Management and Economics

Provided in Cooperation with:

SGH Warsaw School of Economics, Warsaw

Suggested Citation: Shabbir, Aiza; Kousar, Shazia; Kousar, Farzana; Adeel, Amna; Jafar, Rana Adeel (2019) : Investigating the effect of governance on unemployment: A case of South Asian countries, International Journal of Management and Economics, ISSN 2543-5361, Sciendo, Warsaw, Vol. 55, Iss. 2, pp. 160-181,
<https://doi.org/10.2478/ijme-2019-0012>

This Version is available at:

<https://hdl.handle.net/10419/309684>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Empirical Paper

Aiza Shabbir*, Shazia Kousar, Farzana Kousar, Amna Adeel, Rana Adeel Jafar

Investigating the effect of governance on unemployment: a case of South Asian countries

<https://doi.org/10.2478/ijme-2019-0012>

Received April 12, 2019; accepted July 12, 2019

Abstract: This study aims to investigate the short-run and long-run relationship between economic variables and the unemployment rate in South Asian countries. A panel vector error correction model is used to establish the long-run and the short-run relationship between the unemployment rate and the selected economic variables. Data were collected from WDI, WGI, and FDSI for the years 1994–2016. In order to determine the direction of the relationship, the Granger causality test was used. Impulse response functions (IRFs) and forecast error variance decomposition were used to assess the stability of the relationship between the unemployment rate and economic variables over time. The finding of the study showed a negative and significant relationship at the 5% level of significance between governance, internet users, mobile cellular subscriptions, fixed broadband subscriptions, and human capital and the unemployment rate of South Asian economies. On the other hand, financial activity (credit) and population growth had a positive and significant relationship with the unemployment rate. Finally, the Granger causality test showed bidirectional causality between governance and unemployment rate, while internet users and fixed broadband subscriptions showed unidirectional causality with the unemployment rate; furthermore, population growth, financial activity (credit), mobile cellular subscriptions, and human capital showed no causality in the short run.

Keywords: economic variables, unemployment, VECM, South Asian countries, governance, ICT

JEL Classification: E24, J64, O00, O11, E02

1 Introduction

Governance is concerned with decision making, and it is a procedure through which these decisions can be implemented. Governance can be implemented in several perspectives and sectors, i.e., corporate sector governance, governance at the international level, governance at the national level, and local governance. While in case of governance study researcher's emphasise on formal and also informal actors participated

***Corresponding author: Aiza Shabbir**, Department of Economics, Superior University, Lahore, Pakistan,

E-mail: Aizamalik111@gmail.com

Shazia Kousar, Department of Management Sciences, Superior University, Lahore, Pakistan,

E-mail: Shazia.kousar@superior.edu.pk

Farzana Kousar, Department of Economics, Superior University, Lahore, Pakistan,

E-mail: Farzanakousar305@gmail.com

Amna Adeel, Department of Economics, Superior University, Lahore, Pakistan,

E-mail: amnarash33d@gmail.com

Rana Adeel Jafar, Department of Management Sciences, Superior University, Lahore, Pakistan,

E-mail: adeel.jaffar11@gmail.com

in decision making and also involved in the implementation of these decisions United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

Good governance can be defined as the practice of economic, governmental and administrative powers to improve the living standards of the general public. It also utilizes the state's resources optimally for the betterment of the general public. Good governance has multiple indicators but six main indicators, i.e., 1) control of corruption, 2) regulatory quality, 3) political stability, 4) violence and accountability, 5) government effectiveness, and 6) rule of law.

When it comes to measures in respect to for the most part the actual quality related with management, the amount of administration tips have been created, for instance the whole world Bank's Around the world Governance Signals ('WGI') [Kaufmann et al., 2009]. Typically, the world financial institutions get positioning countries around the world together with deference to six features of amazingly incredible management.

These six indicators of governance are as follows:

- (1) **Control of Corruption:** reflects on the extent to which public power is exercised for private purposes, including both the minor and the largest forms of corruption, and the "capture" of the state by elites and private interests.
- (2) **Government Effectiveness:** reflects on the excellence of public services, the excellence of the community service and its amount of independence from governmental pressures, the excellence of policy implementation and development, and the reliability of the government's guarantee to these policies.
- (3) **Political Stability and Absence of Violence/Terrorism:** measure perceptions of the possibility of political instability and/or politically motivated violence, including terrorism.
- (4) **Regulatory Quality:** reflects perceptions of the government's ability to implement sound policies and regulations that enable and promote private sector development.
- (5) **Rule of Law:** the impact and authority of rules on the society where all the members of the society are considered equally. In other words, it reflects opinions on the extent to which agents trust and abide by rules and, in particular, on the quality of contract performance, property rights, the police, and the courts and on the risk of crime and violence.
- (6) **Voice and Accountability:** Voice and accountability is the six and last indicator of the government that represents that a citizen of any country can participate in the selection of the government through electoral or non-electoral procedures; he or she is also involved in selecting free media and is independent to present his or her expressions.

The governance situation is very poor in South Asia compared to other countries because the statistics and numeric score values observed are below zero. One major reason for bad governance in these countries is that these countries' governments have complete control over media. Owing to these circumstances, there is a lack of freedom of expression [Bannaga et al., 2013]. It has been observed that different aspects and variables impact on unemployment such as FDI, population growth, inflation, corruption, and health [Sharif Razavian et al., 2014]. Similarly, traditional variables are also used in the previous studies, but we did not find any evidence in the previous research on South Asian countries by adding this variable set on which this research article is based on governance, human capital, financial activity (credit). ICT variables, i.e., internet user subscriptions furthermore, fixed broadband subscribers, population growth, mobile cellular subscribers as repressors and unemployment as a regressed. Governance is always ignored while researching on the unemployment issue, but it is a dominant and a major indicator that can influence the increase or decrease in the unemployment rate.

1.1 Significance of the study

The main objective of this research was to understand that South Asian and other developing countries are suffering from unemployment issue due to poor governance. According to the International Labor Organization, the total number of people older than 18 years who want to do some job for getting finance and are not able to get any job are said to be in unemployment. The total world population has exceeded

7.1 billion and 1.2 billion people are suffering from unemployment in developing countries. This ratio is 40% of the total world's population [World Bank Group, 2014]. The relationship between governance and unemployment is complex and needs to be studied in a detailed manner. There is an absence of literature that strongly interfaces good governance to unemployment; the fundamental work in this regard is Farid [2015]. This work locates a solid relationship between good governance and improving external debt situation by a Pakistan time series analysis. However, there is no research related to governance and unemployment in the context of South Asian countries.

1.2 Rationale of the study

The whole world population exceeds 7.1 billion, with 1.2 billion youths unemployed who aged from 15 to 25 years mainly in developing countries. It is 40% of the total world's unemployed ratio. Government works as a bridge between policymaking and practice to reduce the unemployment ratio in youths. Because unemployment barriers need to be removed or reduced for country's development, political participation is necessary [World Bank Group, 2014]. The International Labor Organization investigated that the level of unemployment was 13.1% in 2016 and 12.9% in 2015. Hence, bad institutional quality is a major hurdle in the way of development and progress. All indicators of governance are essential to ensure sustainable growth. Unfortunately, no country in South Asia is good in the sense of domestic governance [Chowdhury, 2017].

1.3 Research objective

The present study, examine the relationship between modeled independent variables and unemployment for the years 1994-2016 in South Asian countries. It's an emphasis on the unemployment rate that either proposed variables relationship with unemployment is significant or not.

The objectives of this study were as follows:

- (1) Examine the short-run and the long-run relationship between unemployment and other selected variables.
- (2) Determination of how much forecast error variance of the independent variable can be described by exogenous shocks independent variable?
- (3) Investigate the direction of causality between the unemployment and economic variables.
- (4) Investigate the impact of the relationship between dependent variables in South Asian countries.
- (5) Investigate some policy implications for South Asian countries in view of the findings of this study.

1.4 Research questions

These variables were chosen because they are mostly utilized in the literature to investigate the relationship between the unemployment rate and economic activity.

Thus, the main research questions have been developed and defined as follows:

- (1) What are the internal and external driving forces behind the unemployment rate in the aggregate economic activity of South Asian countries?
- (2) What is the relative contribution of internal and external shocks in the unemployment rate?
- (3) What is the direction of causality among internal & external shocks and unemployment rate?
- (4) How do internal and external shocks affect the unemployment rate in a forecasted period?

1.4.1 Sub-research questions for the study

- (1) What type of relationship exists between internal shocks – governance, financial activity, human capital, population growth, internet users, mobile cellular subscriptions, and fixed broadband subscriptions – and the unemployment rate in South Asian countries?

- (2) What type of relationship exists between external shocks – governance, financial activity, human capital, population growth, internet users, mobile cellular subscriptions, and fixed broadband subscriptions – and the unemployment rate in South Asian countries?
- (3) What is the relative contribution of internal shocks to the unemployment rate in South Asian countries?
- (4) What is the relative contribution of external shocks to the unemployment rate in South Asian countries?
- (5) Is there a long-run/short-run relationship between internal sources and the unemployment rate in South Asian countries?
- (6) Is there a long-run/short-run relationship between external sources and the unemployment rate in South Asian countries?
- (7) What is the direction of causality between external sources and the unemployment rate in South Asian countries?
- (8) What is the direction of causality between internal sources and the unemployment rate in South Asian countries?

2 Literature Review

2.1 Related studies

The concept of governance has been debated in recent years by the researchers. Governance is linked to development and economic growth. Economic growth is the main concern of the general public in the time of stability and in the time of crisis.

Kaufmann et al. [2002] investigated positive relationship among per capita income and good governance in the case of developing and also developed countries. Chatterjee et al. [2006] explored that poor institutional quality and the economic resources, as well as state's capital assets, are accumulated in a few hands, which results in poverty and poor economic growth. Dollar and Kraay [2000] explored that the highest implementation of rule of law leads to a positive and significant impact on poverty reduction. Christiansen et al. [2012] noticed poverty reduction in those countries where there is an improvement in economic policies with the improvement in governance. Ahmed [2001] found that bad governance is a significant problem in the South Asian countries, which has a link with the insignificant implication of poverty reduction policies.

The impact of information and communication technology (ICT) on employment or unemployment has been considerable and an interesting topic in the literature nowadays. A

On the last two centuries, the Middle East and North African (MENA) countries have practiced using extensive use of the latest technology and other communication gadgets such as high-speed computers and the latest mobile phones. For instance, mobile cellular subscriptions are more than 100% in the Middle East and South African countries. Furthermore, MENA countries were observed to have the highest number of internet users compared to other countries.

On the other hand, the MENA countries have the highest number of the youth population, which is recorded as 40% of the total population. However, the young generation could be more skillful and talented, but they are facing unemployment challenges in all the states of MENA. According to International Labor Organization, unemployment in MENA is around 24 percent, which is twice the worldwide average.

The government can implement the development of ICT while making policy to reduce unemployment. Thompson and Garbacz [2015] explored that mobile broadband subscriptions have a negative significant impact on unemployment and economic growth than fixed broadband subscriptions, because people can use mobile applications on their cells and can easily get an online shopping opportunity. Bojnec and Fertoe [2009] argued that mobile broadband subscriptions influence workforce reduction. In other words, the increase in mobile broadband subscription decreases workforce efficiency.

Some studies have investigated how industrial and firm-level outputs are affected by the broadband subscription [Holt and Jamison, 2009]. A theme of this study is that broadband subscription boosts up

the entrepreneurial activities and opens new doors for business and innovations, because more usage of technology reduces the cost, improves the working efficiency, and increases the output level.

A special kind of financial activity is most beneficial for the households and industrial sector [Han et al., 2009]. Organized operation of financial activity is strongly associated with the development of the financial system and economic growth [Gatti, 2012].

High birth and death rates are associated with growth rates. As a result, the timing and components of population growth are important in the economic development process. Dao [2012] found that the growth rate of GDP depends on population growth and growth. mortality rate and if the rate of population growth is less than 1.2% per year. The dependence of the growth rate on the rate of growth and the rate of growth of population growth depend on the rate of growth, the mortality rate and the rate of growth.

2.2 Hypothesis

H1: governance has a significant effect on unemployment in the case of South Asian countries.

H2: internet users has a significant effect on unemployment in the case of South Asian countries.

H3: mobile cellular has a significant effect on unemployment in the case of South Asian countries.

H4: fixed broadband has a significant effect on unemployment in the case of South Asian countries.

H5: human capital has a significant effect on unemployment in the case of South Asian countries.

H6: financial activity (credit) has a significant effect on unemployment in the case of South Asian countries.

H7: population growth has a significant effect on unemployment in the case of South Asian countries.

3 Methodology

3.1 Conceptual framework

This study emphasizes on some major factors such as governance, population growth, internet users, mobile cellular subscriptions, fixed broadband subscriptions, human capital, and financial activity that can affect the unemployment rate in South Asian countries. By utilizing the above variables, a conceptual framework is defined, which is given in Figure 1.

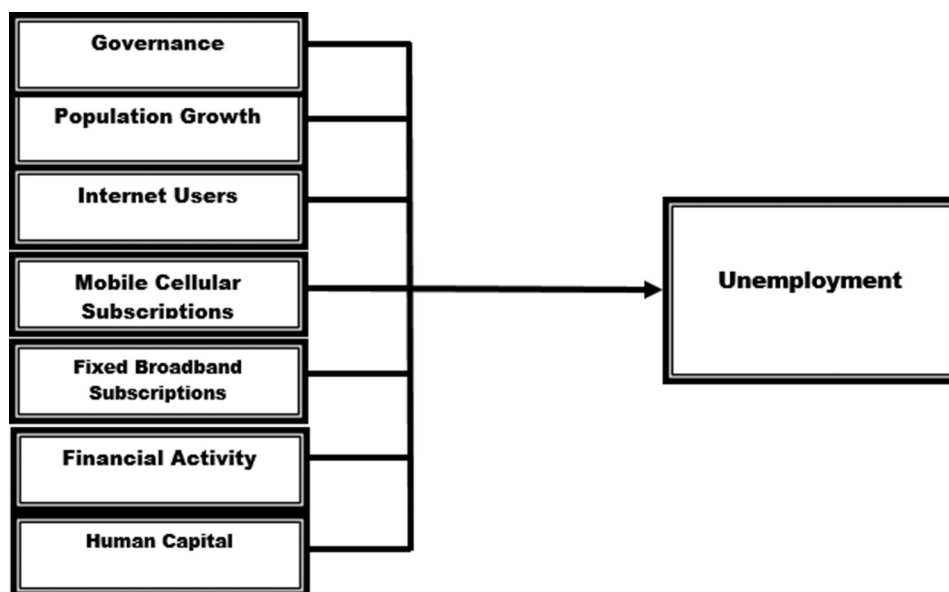


Figure 1. Conceptual framework.

3.2 Variables and data source

Governance (GOV), population growth (POP), internet users (IU), mobile cellular subscriptions (MCS), fixed broadband subscriptions (FBS), human capital (HC) and financial activity (FA), and unemployment are being utilized as variables in the present study. This study is based on panel data, for the time period 1994–2016. The functional form of the model is as follows:

$$UE = f(GOV, POP, IU, MCS, FBS, HC, FA)$$

Table 1. Variable description and sources

Variable	Description	Units	Source
UE	Unemployment rate	% of the total labor force	World Bank
GOV	Governance	Index	Worldwide Governance Indicators
POP	Population growth	Annual %	World Bank
IU	Internet users	Per 100 people	World Bank
MCS	Mobile cellular subscriptions	Per 100 people	World Bank
FBS	Fixed broadband subscriptions	Per 100 people	World Bank
FA	Financial activity	Credit	FSD
HC	Human capital (education)	Gross % of enrollment	World Bank

3.3 Econometric methodology

The study applied advance econometric estimation technique, which is specifically used for panel data, known as vector error correction model (VECM); this study tested the long-run association between modeled economic variables and the unemployment rate for South Asian countries, i.e., Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, and Srilanka.

$$UE_{it} = \beta_0 + \beta_1 (Gov_{it}) + \beta_2 (Pop_{it}) + \beta_3 (IU_{it}) + \beta_4 (Mcs_{it}) + \beta_5 (Fbs_{it}) + \beta_6 (VA_{it}) + \beta_7 (RQ_{it}) + \mu_{it} \quad (3.1)$$

where UE = unemployment rate, Gov = governance, Pop = population growth, IU = internet users, Fbs = fixed broadband subscriptions, Mbs = mobile cellular subscriptions, FA = financial activity, HC = human capital, i = countries in the panel, and t = time duration or period.

3.3.1 Panel unit root tests

By involving overall literature, the empirical estimation starts with the estimation of the stationarity property by incorporating modeled variables into the econometric model. The unit root test is very important in case of time series and panel data because if data will not be tested for the stationarity, results may be spurious, which means results will present spurious relationship among variables. Time series/panel data should be constant/stationary over time; otherwise, results would be misleading. There are several tests to check the stationarity of the panel data, such as the Levin–Lin–Chu (LLC) test and the Im, Pesaran and Shin (IPS) test. These two tests are more appropriate to test the data stationarity of panel data. LLC and IPS test equation can be written in the following form:

$$\Delta x_{it} = \alpha_i + \beta x_{i,t-1} + \sum_{j=1}^{pi} \beta_{ij} \Delta x_{i,t-j} + \mu_{it} \quad (3.2)$$

3.3.2 Optimal lags selection

An important step in model constructing is the choice regarding the lag order. In this paper, we use the most commonly used lag-order determination criteria to choose the lag order, such as AIC and SIC. As indicated by Stock and Watson [2012], selection of less lag perhaps leads to loss of the valuable data, whilst an extreme number regarding lags overfits the model.

$$AIC_{(P)} = \ln \left[\frac{SSR_{(P)}}{T} \right] + (P+1) \frac{2}{T} \quad (3.3)$$

$$SIC_{(P)} = \ln \left[\frac{SSR_{(P)}}{T} \right] + (P+1) \frac{\ln(T)}{T} \quad (3.4)$$

3.3.3 Vector auto regression

This study uses the vector auto regression (VAR) model. This model is selected on the basis of the association among the selected variables. The VAR display has some great attributes. The econometrician does not need to stress over the factors that are endogenous or exogenous, and the forecasts obtained from this model is realistic than others. Several researchers The VAR model equation is as follows:

$$y_t = A_0 + \sum_{j=1}^k m_j y_{t-j} + \sum_{r=1}^n a_r x_{1t-r} + \sum_{r=1}^n b_r x_{2t-r} + \sum_{r=1}^n c_r x_{3t-r} + \sum_{r=1}^n d_r x_{4t-r} + \varepsilon_t \quad (3.5)$$

where y_t = UE over time t , y_{t-1} = lagged value of unemployment rate, x_{t-r} = lagged economic variables, and ε_t = white noise vector over time t .

3.3.4 Panel cointegration

After testing unit root panel, cointegration should take place. Cointegration predicts the existence or inexistence of long-run association between variables. If cointegration is found, then it means that modeled variables will move together in the long term. There are two tests used for testing cointegration. In the present study, both kinds of test have been utilized, i.e., the residual-based cointegration test is also called Kao integration test.

The current study utilized a unit root test that showed that all modeled variables are stationary on the first difference; according to the unit root property, order of integration of all variables is 1 (I).

In case the order of integration of all variables is 1 (I), we used Kao and Johansen cointegration tests in the panel data context and illustrated a model as follows:

$$y_{it} = \beta_1 + p_i t + \beta_{1i} x_{1,it} + \beta_{2i} x_{2,it} + \beta_{3i} x_{3,it} + \dots + N + \varepsilon_{it} \quad (3.6)$$

3.3.5 Panel VECM

To recognize the direction of the short-run and long-run causality, we considered VECM. VECM is the extensive form of error correction term. VECM is used when there are two or more than two variables in the model that are stationary on the first difference.

All modeled variables are considered to remain endogenous in the VECM technique.

The VECM equation for eight variables can be composed as follows:

$$\begin{aligned} \Delta ue_t = & \alpha_1 + \sum_{i=1}^p \beta_{1i} \Delta ue_{t-1} + \sum_{i=1}^p \beta_{2i} \Delta pop_{t-1} + \sum_{i=1}^p \beta_{3i} \Delta fbs_{t-1} \\ & + \sum_{i=1}^p \beta_{4i} \Delta iut_{t-1} + \sum_{i=1}^p \beta_{5i} \Delta mcs_{t-1} + \sum_{i=1}^p \beta_{6i} \Delta gov_{t-1} + \sum_{i=1}^p \beta_{7i} \Delta hc_{t-1} + \sum_{i=1}^p \beta_{8i} \Delta fa_{t-1} + \lambda_1 ECT_{t-1} + \mu_1 t \end{aligned} \quad (3.7)$$

where μ_{it} = random errors, ECT_{t-1} = integrating vectors, λ = adjustment coefficient for disequilibrium in the last year, α = speed adjustment coefficient regarding the long-run correction term, and β = individual variables' coefficient in the error correction term.

3.3.6 Impulse response

Impulse response is a graphic illustration regarding forecasting and can be analyzed using the VAR model. IRF quantifies the effect over time of each variable. Investigation of the behavior of one variable due to a change in other variable is the main function of the IRF.

This study uses the IRF for 10 years (2016–2026), which is given as follows:

$$A_s = \frac{\delta Y_{t+s}}{\delta Y_{t\epsilon_t}} + \sum_{t=1}^n \frac{\delta Y_{t+s}}{\delta X_{t\epsilon_t}} \quad (3.8)$$

where, Y_t = UE at time t , X_t = each variable selected in this study at time t , Y_{t+s} = s -step ahead UE, and ϵ_t = white noise vector at time t .

3.3.7 Variance decomposition

This study investigates variance decomposition for ten years from 2016 to 2026. The equation of variance decomposition used in this study is taken from Campbell and Ammer [1993] and is given as follows:

$$B_n = \frac{\delta \sigma^2 y_{t+n}}{\sum_{t=0}^{n-1} \epsilon_{yt,t+n-1}} + \sum_{j=1}^p \frac{\delta \sigma^2 y_{t+n}}{\sum_{t=0}^{n-1} \epsilon_{xjt,t+n-1}} \quad (3.9)$$

here, Y_t = UE at time t , X_{jt} = remaining variable over time t , $Y_t + n$ = n -step forward forecast error for UE, ϵ_{yt} = white noise vector for the UE at time t , ϵ_{xjt} = white noise vector for each variable at time t , and σ^2 = variance of a variable.

3.3.8 Granger causality test

In economics, it is vital to figure out whether an economic variable would help forecast another variable. Determination of the causal direction of variables and short-run impact of relationship can be analyzed by the approach given by Granger [1969] and Sims [1972]. According to Granger [1969], the definition of causality is “ X is a granger cause of Y ”. If variable Y_t stays expected through the use of the previous terms regarding a variable X_t , then it can be said that X_t brings in relation to Y_t .

$$Y_t = \beta_0 + \sum_{j=1}^n \beta_{1j} Y_{t-1} + \sum_{h=1}^p \beta_{2h} X_{t-p} + \varepsilon_{1t} \quad (3.10)$$

$$X_t = \alpha_0 + \sum_{s=1}^k \alpha_{1s} X_{t-s} + \sum_{t=1}^m \alpha_{2t} X_{t-m} + \varepsilon_{2t} \quad (3.11)$$

where, Y_t = UE at time t , X_{t-p} , X_{t-m} = UE lags, X_t = other selected variables at time t , X_{t-p} , X_{t-s} = other selected variables' lags, and ε_{1t} , ε_{2t} = white noise vector for time t .

3.4 Methodology flow chart

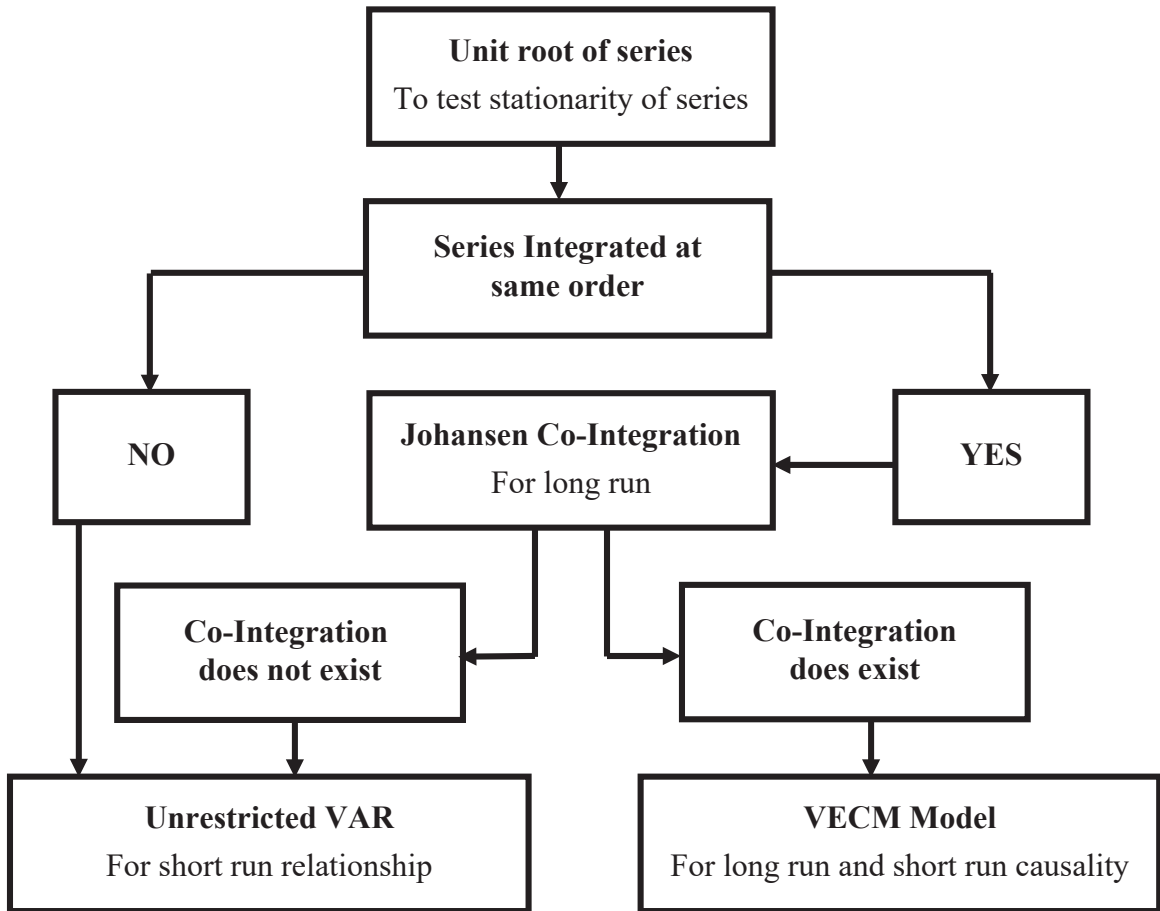


Figure 2. Methodology flow chart.

4 Empirical Findings

4.1 Descriptive Statistics

Descriptive statistics give the basic summaries of the data of the variables under consideration. These statistics are used to describe the characteristics of data. Table 2 shows the results of the descriptive statistic in detail.

Table 2. Descriptive statistics

	UE	GOV	POP	IU	MBS	FBS	HC	FA
Mean	4.4891	0.0045	-0.0259	-0.0798	26.04072	1.0522	-0.0061	40.194
Median	3.9120	0.0074	-0.0357	0.3329	4.761983	0.4996	-0.0966	44.160
Maximum	13.030	0.5988	0.9557	9.5000	115.3790	5.7863	2.7491	86.186
Minimum	0.6500	-0.8829	-1.0564	-21.824	0.000000	-2.1401	-3.4107	-13.850
SD	2.7037	0.2420	0.2114	3.7815	32.52466	1.6768	1.4838	23.982
Skewness	1.2746	-0.4964	0.2574	-2.5320	0.884126	1.1617	-0.2005	-0.6672
Kurtosis	4.1690	4.1290	15.782	13.930	2.372628	4.0800	2.2792	2.7402
Jarque-Bera	46.539	13.373	968.27	858.61	20.79126	38.842	4.0249	10.936
Probability	0.0000	0.0012	0.0000	0.0000	0.0000	0.0000	0.1336	0.004219
Observations	161	161	161	161	161	161	161	161

SD, standard deviation.

Table 2 represents the detailed investigation of the variables, which includes 161 observations from 1994 to 2016. It can be seen that the mean value of unemployment is 4.48 with a standard deviation (SD) of 2.70 and maximum and minimum values of 13.03 and 0.65, respectively. The calculated statistics of Jarque-Bera and corresponding *p*-values are used for testing the normality assumption. It demonstrates that the residuals of all variable are not normally distributed. The null hypothesis of the normality test is that residuals are normally distributed, while the probability value is more than 5%. Subsequently, we acknowledge the alternative hypothesis that residuals are not normally distributed, and still, we can accept the model.

The mean value of the population growth is -0.02 with an SD of 0.21 and maximum as well as minimum values of 0.95 and -1.05, respectively. The average value of governance is 0.00, with an SD of 0.24. Furthermore, internet users, mobile cellular subscriptions, fixed broadband subscriptions, financial activity, and human capital have average values of -0.07, 26.04, 1.05, -0.00, and 40.14 with SD values of 3.78, 32.52, 1.67, 23.98, and 1.48, respectively.

4.2 Panel unit root results

Table 3 confirms the outcomes of stationarity. In the present study, two types of unit root test are used to test the stationarity of modeled variables. Checking the stationarity of the variables is very important before any other test. LLC represents the null hypothesis that there is a unit root [Levin et al., 2002]. Checking the stationarity of the variables is very essential to avoid the spurious results. In the abovementioned tables, it has been found that on the level, not nay variable found stationary while variables are stationary on the first difference. So, all modeled variables are stationary on the first difference. In the next step, we will check and apply another methodology on the basis of data stationarity.

Table 3. Panel unit root test

Variables	Levin, Lin & Chu test				Im, Pesaran and Shin test				Decision
	Level		First difference		Level		First Difference		
	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value	
UE	-2.427	0.007	-9.034	0.00	-0.454	0.324	-9.715	0.00	I(1)
GOV	-1.626	0.051	-8.769	0.00	-1.28	0.098	-10.05	0.00	I(1)
POP	1.346	0.910	-3.234	0.00	-2.34	0.009	-7.624	0.00	I(1)
IU	5.966	1.000	-9.196	0.00	-1.41	0.078	-9.829	0.00	I(1)
MCS	-1.538	0.062	-5.641	0.00	-3.38	0.000	49.68	0.00	I(1)
FBS	0.114	0.545	-4.275	0.00	-0.832	0.202	49.17	0.00	I(1)
FA	-0.306	0.379	-10.21	0.00	0.007	0.503	-7.058	0.00	I(1)
HC	0.333	0.630	-8.735	0.00	1.400	0.919	-5.99	0.00	I(1)

Null hypothesis: There is a unit root/variable is not stationary.

4.3 Optimal lag selection

For optimal lag determination, the use of a large number of variables in the analysis might lead to errors in the result. On the other hand, if we use fewer variables in our study, then some important information can be left. By theory and experience, one can select the optimal lag length, but there are certain criteria such as BIC, AIC, and HQIC, which help determine the lag length. Table 6 exhibits the aftereffects of optimal lags. We have chosen the value of 3 as the ideal lag based on AIC.

Table 4. Optimal lag length selection

Lag	Log (L)	LR	FPE	AIC	SC	HQ
0	-1785.819	NA	20168.37	32.61488	32.81128	32.69454
1	-1085.927	1285.255	0.192653	21.05322	22.82081	21.77016
2	-939.9511	246.8322	0.044144	19.56275	22.90152	20.91697
3	-897.7784	65.17604	0.068647	19.95961	24.86957	21.95112
4	-841.4533	78.85510	0.086160	20.09915	26.58030	22.72794

Table 4 shows the results of the optimal delays. The optimal selection of delays is a delicate task because if we include too many delays in the model, this could lead to an error in the forecasts, while if we add too few delays, it will lead to irrelevant information. Experience, knowledge, and theory are the best ways to select optimal delays, but there are information criteria procedures that can be selected by optimal delays. There are three commonly used information criteria, namely, SBIC, AIC, and HQIC. This study selects two optimal delays based on AIC. In addition, since the criterion generally suggests two as the optimal length of delays, we will, therefore, conduct the study on hand with two optimal delays.

4.4 Johansen cointegration test

To investigate the relationship between non-stationarity variables, the cointegration technique is used. In this study, we have used the Johansen cointegration test. The Johansen test takes into account more than one cointegrating relationship. If the sample size is too little, then the outcomes would not be reliable and auto regressive distributed lags (ARDLs) can be used. We can determine the relationship among variables through the trace test and maximum eigenvalue test. If the variables are stationary and cointegrated, then the VECM should be preferred.

Table 5. Results for Johansen cointegration test

Hypothesized no. of CE(s)	Fisher's statistic* (from trace test)	<i>p</i>	Fisher's statistic* (from max-Eigen test)	<i>p</i>
None	6.931	0.7319	6.931	0.7319
At most 1	5.545	0.8519	23.97	0.0077*
At most 2	1.386	0.9992	75.07	0.0000*
At most 3	92.10	0.0000*	92.10	0.0000*
At most 4	205.2	0.0000*	124.7	0.0000*
At most 5	117.9	0.0000*	84.62	0.0000*
At most 6	55.01	0.0000*	41.14	0.0000*
At most 7	35.30	0.0001*	35.30	0.0001*

Null hypothesis: There is no cointegration.

CE, cointegration equation.

*Cointegration exists in this equation.

Table 5 demonstrates the null hypothesis of no cointegrating vector for 1–7 cointegrated vectors, under the trace and eigenvalue tests. The null hypothesis in the case of none means there are no cointegration equations (CEs). The discovery of the cointegration test suggested six CEs based on the trace test and seven CEs based on the max-Eigen test.

4.5 Kao residual cointegration test

Table 6. Results for Kao Residual Cointegration Test

Kao Residual Cointegration Test	<i>t</i> -Statistic	<i>p</i>
ADF	-5.252339	0.0000
Residual variance	29.53757	
HAC variance	27.06740	

Null hypothesis: There is no cointegration.

Table 6 presents the result of Kao's cointegration test. This test is used to check the cointegration. If the null hypothesis will reject with no cointegration, then the value of probability will be consistent. A total of two cointegration tests were applied in this study. The VECM was applied on panel data to investigate the long-run and short-run relationship among variables.

4.6 Long-run relationship of VECM

VECM is a settled model that consolidates the long-run equilibrium relationship between no stationary variables, i.e., I (1) and their short-run adjustment behavior. Short-run part of the VECM reflects adjustments of model variables that are required to keep up their long-run equilibrium relationship, which is stationary. VAR/VECM is preferred over conventional simultaneous equations models. One might say that the latter recognizes variables among two distinct groups, independent and dependent, while the previous treats all variables in a similar balance, i.e., every one of them are expected to be endogenous. VAR/VECM are overparameterized, and in this way, all coefficient assessments may not show up statistically significant. Coefficient estimates over the long-run part of the VECM and the short-run change parameters are required to be statistically significant.

All the variables under consideration in this study are stationary at first difference and they have the long-term cointegration. VECM is a fitted model to investigate whether there exists a long-run and a short-run relationship among the variables or not. Table 8 exhibits the long run results of VECM.

Equation 4.1 indicates results of long run before reversing signs of coefficients obtained from the panel VECM:

$$\begin{aligned} UE_{t-1} + 10.84378 + (292.7914)GOV_{t-1} - (1581.992)POP_{t-1} + (36.60697)IU_{t-1} + (1.706136)MCS_{t-1} \\ + (40.25355)FBS_{t-1} - (3.434502)FA_{t-1} + (25.50285)HC = 0 \end{aligned} \quad (4.1)$$

Equation 4.2 shows long-run results after changing signs of the coefficients.

$$\begin{aligned} UE_{t-1} = 10.84378 - (292.7914)GOV_{t-1} + (1581.992)POP_{t-1} - (36.60697)IU_{t-1} - (1.706136)MCS_{t-1} \\ - (40.25355)FBS_{t-1} + (3.434502)FA_{t-1} - (25.50285)HC = 0 \end{aligned} \quad (4.2)$$

Table 7 demonstrates long-run results of vector error correction model.

While interpreting VECM results, we have to reverse the signs of our coefficients in order to make the equation equal to zero. So, in the first equation, the coefficient sign is as it is, while in the second one, signs are reversed.

Table 7. Long-run relationship of VECM

Variables	Coefficients	Standard errors	<i>t</i> -value
FA (–1)	+0.620559	0.95581	–3.59327
FBS (–1)	–0.531762	15.2189	2.64497
GOV (–1)	–0.526023	91.4792	3.20063
HC (–1)	–0.450647	9.79514	2.60362
IU (–1)	–0.334496	7.54714	4.85044
MCS (–1)	–0.127821	0.68663	2.48479
POP (–1)	+0.802420	193.675	–8.16830
<i>C</i>	10.84378		
CointEq1	–0.072136	0.01545	–4.66826
<i>R</i> -squared	0.641065		
<i>F</i> -statistic	2.535735		

VECM, vector error correction model.

Table 7 reports long-run coefficients, standard errors, and *t*-values for VECM. The coefficient of ECT (a) can be interpreted as the rate of shock convergence in the current period toward the equilibrium in the next period. In other words, CointEq1 tells us the velocity of adjustment, the rate through which our dependent variable returns back toward equilibrium, due to an exogenous shock. The error correction term must be negative and significant; negative sign shows movement of dependent variable toward equilibrium, while a positive sign indicates movement of dependent variable away from equilibrium. This value must lie between 0 and –1, where 0 indicates no adjustment, while –1 represents 100% adjustment. Our results show a value of –0.07, which means 7% speed of adjustment of the dependent variable can move toward equilibrium in one year from now.

The findings of a study show that financial activity and unemployment rate have a positive and significant association in the long run at 5% level of significance; financial activity coefficient value shows that if we increase one unit in financial activity, unemployment rate increases by 0.620559 units. This is in line with the findings of Ordine and Rose [2009], Han et al. [2009], and Pagano and Pica [2012]. The population growth also has a significant and positive long-run relationship with the unemployment rate; if we increase one unit of population in the response, unemployment increases by 0.802420 units in the South Asian countries.

In addition, fixed broadband subscriptions have a negative and significant association with the dependent variable; if we increase one unit in fixed broadband subscriptions, in this response, unemployment will decrease by –0.531762 units. Furthermore, the finding of the study at hand confirms claims of Holt and Jamison [2009] and Grimes et al. [2012] that fixed broadband subscriptions affect unemployment negatively. Moreover, the outcome of the study offering a negative and significant relationship between governance and unemployment means that if we improve governance by one unit, in response, there will be a decrease of –0.526023 units in unemployment [Christiansen et al., 2012; Chatterjee et al., 2006; Resnick and Birner, 2006].

On the other hand, internet users and unemployment have a significant and negative association: one unit increase in internet users will become a decrease of –0.334496 units in the unemployment rate. The study is in line with Legrain et al. [2015]. Human capital and mobile cellular subscriptions also have a negative and significant relationship with the unemployment rate in the long run as one unit increase in human capital will decrease –0.450647 units in the unemployment rate. The study is in line with Bashir et al. [2012]. The mobile cellular subscription also has a negative and significant effect on the unemployment rate because of the coefficient value as one unit change in a mobile cellular subscription will decline –0.127821 units in the unemployment rate. The study is in line with Bojnec and Fertoe [2009] and Thompson and Garbacz [2015]. All proposed variables have a significant but negative and positive type of effects on the dependent variable in the long run for emerging economies.

Table 7 indicates other necessary statistics. Moreover, *R*-square value of 0.64 shows that 64% variation in independent variable is due to projected explanatory variables, while 36% variation is due to other variables that are not included in the model. *F*-statistic with 2.53 value indicates that the overall model is good.

4.7 Short run Granger causality test

Causality is the association between cause and effect. For finding this association, the study uses Granger causality test. This causality shows that one variable can help to forecast the other variable. There can be two sorts of causality relationship between variables, i.e., bidirectional causality and unidirectional causality.

Cause is an independent variable, while Effect is a Dependent Variable. In Cause-Effect relationship, we will always test sufficient condition, to begin with. If a necessary condition is available, then it implies that the fundamental condition will naturally be available. In bidirectional causality, Cause variable causes Effect variable, and likewise, Effect variable causes Cause variable. This implies both responses can occur at the same time.

After the VECM model, the Granger causality test is utilized to determine the direction of the variables and the GDP of Pakistan. Table 8 summarizes the results.

Table 8. Results of the Granger causality test

Granger causality test: emerging and growth leading economies			
Null hypothesis	F-statistics	p	Decision
GOV does not Granger cause UE	3.04895	0.0505**	Bidirectional
UE does not Granger cause GOV	2.90152	0.0582**	Causality
POP does not Granger cause UE	1.05352	0.3514	No
UE does not Granger cause POP	1.62622	0.2003	Causality
HC does not Granger cause UE	0.85811	0.4265	No
UE does not Granger cause HC	0.45764	0.6339	Causality
IU does not Granger cause UE	2.82781	0.0947**	Unidirectional
UE does not Granger cause IU	1.27496	0.2606	Causality
MCS does not Granger cause UE	0.26316	0.7690	No
UE does not Granger cause MCS	0.27047	0.7634	Causality
FBS does not Granger cause UE	0.55304	0.4582	Unidirectional
UE does not Granger cause FBS	6.51372	0.0117*	Causality
FA does not Granger cause UE	0.76037	0.4696	No
UE does not Granger cause FA	0.80089	0.4512	Causality

Decision rule: Reject H₀, if the p-value is less than 0.05.

*Signifies the refusal of a null hypothesis at the 5% level of significance.

**Signifies the refusal of a null hypothesis at the 10% level of significance.

Table 8 shows that there is a unidirectional, bidirectional, and no causality running between the proposed variables in the short run, implying that some variables do Granger cause to unemployment. The results of Granger causality between unemployment (UE) and governance (GOV) in the developing economies are presented in the above given table. There is a unidirectional causality running between internet users (IU), fixed broadband subscriptions (FBS), and the unemployment rate in the short run; this implies that IU and FBS do Granger cause to UE. Meanwhile, no causality was found between population growth (POP), human capital (HC), mobile cellular subscriptions (MCS), and financial activity (FA) in the short run.

4.8 Impulse response function

IRF of a dynamic framework is its outcome when given a brief information signal, called an impulse. Generally, an impulse response refers to the response of any dynamic framework in the response to some outer change. Using generalized decomposition on a VAR model with ordering, i.e., unemployment rate, governance, population growth, internet users, mobile cellular subscriptions, fixed broadband subscriptions, human capital, and financial activity, authors calculate the following IRFs for emerging and growth leading economies' unemployment rate.

Response to Generalized One S.D. Innovations

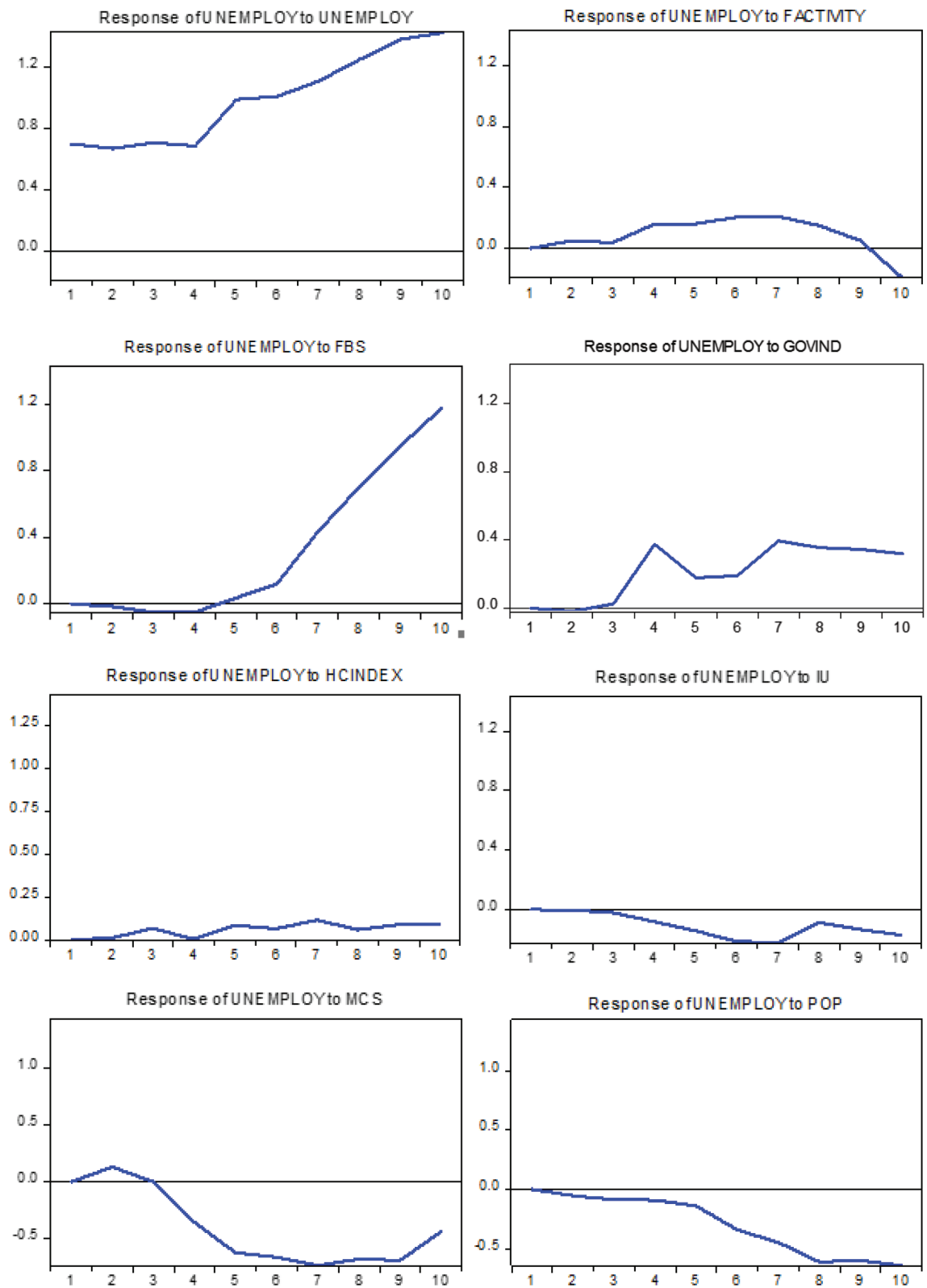


Figure 3. Impulse Response Function: Response to Generalized 1 SD Innovations. SD, standard deviation.

Figure 3 indicates the results of the IRF. To interpret the IRFs, one needs to clearly understand what impulse response is. The impulse response is actually showing the response of one variable to the shocks in other variables. The shocks and impulse are measured to changes in variables in SD values. Like, it is to find out if one variable changes by 1 unit of SD, how much change occurs in the response variables. Then, this response is taken over time, and if the response comes back to the horizontal/zero line, one can say that the response is temporal and will subside in the given time periods that take the response to come to zero line. If the response deviates from zero line, we can comment that the impulse has a nonconvergent and nontemporal response to the shock. It can be related to theory by seeing if some policy shocks produce temporary effects or a longer and accumulating effect adding up over time and changing the pattern of the economic changes. These responses are graphically represented in Figure 3.

4.9 Forecast error variance decomposition

Variance decomposition is a short-run dynamic examination that can draw inferences about the short-run causality between the UE and the economic variables from the VAR models. Variance decomposition decides the amount of the forecast error variance of each variable as expected to their “own” shocks, instead of the shocks to the other variables in the system. Table 11 shows the results for variance decompositions on a logarithmic scale.

Table 9. Results for forecast error variance decompositions

Period	SE	UE	GOV	POP	IU	MCS	FBS	FA	HC
1	0.700	100.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.981	97.54	0.256	0.026	0.038	0.013	0.000	1.816	0.307
3	1.217	97.24	0.261	0.198	0.068	0.312	0.032	1.182	0.699
4	1.504	84.46	1.274	0.254	6.263	0.204	0.316	6.398	0.825
5	1.934	77.34	1.461	0.184	4.640	0.313	0.734	14.294	1.027
6	2.337	71.70	1.763	0.387	3.840	0.291	1.342	17.824	2.843
7	2.809	65.31	1.772	2.655	4.638	0.372	1.564	19.187	4.492
8	3.310	61.43	1.482	6.417	4.493	0.300	1.196	18.027	6.644
9	3.841	58.62	1.117	10.85	4.144	0.277	1.009	16.616	7.356
10	4.354	56.41	1.058	15.73	3.763	0.259	0.939	13.943	7.888

Table 9 shows the results of the decomposition results of the variance. Variance decomposition is an econometric technique introduced for the first time by Sims [1980], often applied to VAR models. The main purpose of this technique is forecasting. With the help of variance decomposition analysis, an economist may observe that the magnitude of the forecast error variance for each of the variables can be explained by exogenous shocks to the other variables. Table 9 presents this in the first period; Unemployment (UE) in emerging economies and fast-growing economies attributes 100% of its changes to its own shock, not to any economic variables.

However, in the second period, forecast error for UE attributes to 0.25% governance and 0.02% due to the population. The third fluctuation period encounters a slight change because variation in UE is not only due to governance (0.26%) and population (1.98%) but also due to human capital (0.69%). Variance in the period 4 in unemployment is 84% due to UE’s own shock, while 1.27% is due to governance, 0.25% is due to population, 6.26% is due to internet users, 0.20% is due to mobile cellular subscriptions, 6.39 is due to financial activity, 0.82% is due to human capital, and 0.31 is due to fixed broadband subscriptions. In the period 5, maximum fluctuation in UE is due to its own shock (77%), while 1.46% is due to governance, 0.18% is due to population, 4.64% is due to internet users, 0.31% is due to mobile cellular subscriptions, 14.02 is due to financial activity, 1.02% is due to human capital, and 0.73 is due to fixed broadband subscriptions. From the period 5 to 10 tracks the perceived pattern, Where the difference in UE because of its own shock declining gradually, yet fluctuation into UE because of financial activity increases till period 7 and after period seven changes in UE diminishes because of population increase due to the time period under study.

4.10 Model stability test

If the evaluated VAR and VECM are stable, then all the coefficients must be less than 1, i.e., inside the unit circle; otherwise, certain results are not valid. Figure 4 illustrates this condition. We can draw the right conclusion from IRFs and forecast-error variance decompositions (FEVDs) if our VAR model is stable, and it is a basic assumption of the VAR model that the model must be stable. In the above graph of AR roots, all the dots are within the circle, and it is a rule of thumb that if dots remain within the circle, VAR model is treated as stable; hence, we can rely on the output of IRFs and FEVDs.

In Figure 4, all the dots inside the circle are regarded as stable.

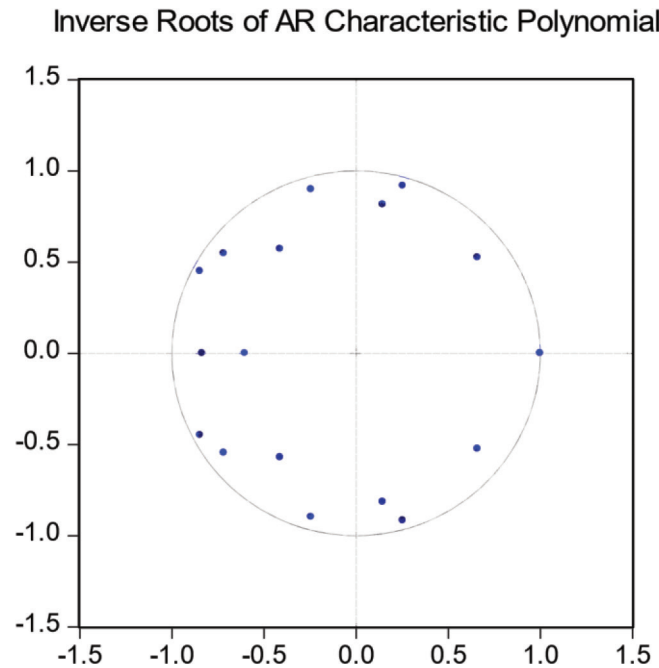


Figure 4. Model stability test.

4.11 Diagnostic tests

To examine the robustness of the selected model, this work utilizes necessary diagnostic tests, which are as follows.

4.11.1 Autocorrelation

Table 10. Serial Correlation Test

Lags	LM-Stat	<i>p</i>
1	98.19758	0.0039
2	104.3011	0.0011
3	95.75344	0.0062
4	79.53887	0.0912
5	83.15507	0.0541

Null hypothesis: There is no serial correlation.

Table 10 represents that autocorrelation or serial correlation is the relationship of a signal with itself at various points of time. It is the likeness between the observations as a function of the time lag between them. Table 10 speaks of the consequences of the serial relationship. If we utilize just a single lag, then it

can be seen that there could be a problem of autocorrelation; if we increase optimal lag until lag 3, serial correlation issue settled; and if we utilize more than three lags, serial relationship again exists. Henceforth, to keep away from serial correlation, we have chosen lag 3 as ideal.

4.11.2 Heteroscedasticity test

The variance of the error must be constant across observations. If the errors have constant variance, then the errors are called homoscedastic, which is desirable. Otherwise, it could lead to the issue of the wrong estimation of results, known as heteroscedasticity.

Table 11. Heteroscedasticity Test (Breusch–Pagan–Godfrey)

Test	Chi-square	<i>p</i>
Joint test	3067.172	0.0683

Null hypothesis: homoscedasticity.

Table 11 shows the result of the test of heteroscedasticity, with the null hypothesis of homoscedasticity, if the probability value of the test of heteroscedasticity is greater than 5%, it is the proof of the absence of problem of heteroscedasticity in the model and this is desirable. Since the probability values for heteroscedasticity show a probability value greater than 5%, we now accept the null hypothesis of homoscedasticity.

4.11.3 Multicollinearity test

Multicollinearity exists whenever an independent variable is highly associated with at least one of the other independent variables in a multiple regression equation. Multicollinearity is an issue since it undermines the statistical significance of an independent variable. The variance inflation factor (VIF) is utilized as an indicator of multicollinearity. Computationally, it is characterized as the proportional of resistance, i.e., $1/(1 - R_2)$. Keeping all the other factors constant, it is desirable to bring down levels of VIF, as a higher level of VIF is known to unfavorably influence the results.

If coefficient values are more than 0.8, it demonstrates the multicollinearity issue. Our results show that all coefficient values are less than 0.8, which is a proof that the model is free from multicollinearity. Table 12 shows no multicollinearity.

Table 12. Multicollinearity Test

Variables	FA	FBS	GOV	HC	IU	MBS	POP
FA	1.00						
	–						
FBS	–0.56	1.00					
	–8.16	–					
GOV	–0.10	0.16	1.00				
	–1.20	2.00	–				
HC	0.65	–0.23	–0.04	1.00			
	10.3	–2.85	–0.51	–			
IU	0.26	–0.08	–0.14	0.21	1.00		
	3.22	–1.03	–1.77	2.58	–		
MBS	–0.36	0.13	0.17	–0.21	–0.27	1.00	
	–4.70	1.58	2.08	–2.54	–3.38	–	
POP	–0.08	0.15	0.06	–0.10	–0.00	0.04	1.00
	–1.01	1.83	0.72	–1.26	–0.10	0.53	–
UE	–0.24	0.04	0.02	–0.03	0.09	–0.23	–0.28
	–2.99	0.57	0.34	–0.47	1.08	–2.82	–3.46

4.12 Lag exclusion Wald test

This test is carried out for each lag in VAR. The Wald statistics for the joint significance of all variables are reported for every equation independently and together for each lag in Table 13.

Table 13. Lags exclusion Wald test

	Chi-squared test statistics for lag exclusion								
	d(UE)	d(FA)	d(FBS)	d(GOV)	d(HC)	d(IU)	d(MCS)	d(POP)	Joint
DLag 1	2.506 [0.9614]	14.929 [0.0605]	17.171 [0.0284]	27.848 [0.0005]	16.686 [0.0335]	10.531 [0.229]	30.875 [0.0001]	105.051 [0.0000]	287.87 [0.000]
DLag 2	3.002 [0.9342]	19.338 [0.0132]	31.285 [0.0001]	12.528 [0.129]	21.656 [0.0056]	8.153 [0.418]	13.469 [0.0967]	26.211 [0.0010]	154.698 [0.000]
DLag 3	11.082 [0.1971]	15.685 [0.0471]	12.816 [0.1183]	2.6085 [0.956]	19.692 [0.0116]	2.411 [0.965]	4.8671 [0.7717]	35.783 [0.0000]	110.890 [0.0003]
DLag 4	14.027 [0.0011]	16.400 [0.0370]	76.592 [0.0000]	3.212 [0.9203]	13.160 [0.1065]	13.564 [0.093]	19.335 [0.0132]	47.179 [0.0000]	200.654 [0.0000]
df	8	8	8	8	8	8	8	8	64

The numbers written in [] are *p*-values.

The results demonstrate that with four lags, we are getting a significant impact on the variables. Thus, this test affirms that we have to utilize four lags as an ideal lag length.

5 Conclusion

5.1 Discussion of the findings

Kaufmann et al. [2002] claimed that per capita income and governance performance are strongly associated and positively correlated in different countries. After the empirical study, this kind of correlation can be divided into two categories. The first category is good governance is the cause of high per capita income. It shows a strong positive effect. Finally, the empirical findings confirmed that good governance is the cause of sustainable development. Based on these concepts, seven hypotheses have been developed which have been discussed in detail below.

The first hypothesis states that there is a negative significant relationship between founder governance and the unemployment rate. The relation is evident from VECM analysis and where the value of the coefficient is negative and significant (-0.526023) in the case of South Asian countries. Hence, our first hypothesis is accepted. The result is in line with the findings of earlier studies [Christiansen et al., 2012]. The second hypothesis states that internet users have a considerable effect on unemployment in the case of South Asian countries. Like earlier relation, the hypothesis is accepted as a VECM result is negative and significant (-0.334496). As far as the third hypothesis is concerned, as there is a negative and significant impact of mobile cellular subscriptions, it has been accepted as the coefficient value is -0.127821.

The fourth hypothesis states that fixed broadband subscriptions have a significant effect on the unemployment rate. The VECM results shown in the regression Table 6 state that significant and negative instant relation exists (-0.531762) in South Asian countries. The results are in line with the recommendation [Holt and Jamison, 2009], which is the basic study to theorize the current model. The fifth hypothesis states that population growth has a considerable effect on unemployment in the case of South Asian countries. The results are in line with Bloom and Freeman [1988]. Table 6 states that a significant and positive relationship exists in the instant relation (0.802420). The six hypotheses of financial activity have a considerable effect on the unemployment rate. The VECM results shown in the regression Table 6 state that significant and positive result exists in the direct relation (0.620559) in the case of South Asian countries.

The study is in line with Ordine and Rose [2009], Han et al. [2009], and Pagano and Pica [2012]. The seventh and last hypothesis states that there is a negative and a significant relationship between human capital and unemployment rate. As mentioned in the VECM results, the coefficient value is -0.450647 . Consequently, all variables exhibit significant results on unemployment but some variables show a negative impact and some show a positive impact on the unemployment rate in South Asian countries.

This study supports ICT promotion and focuses on organized credit supply operation, control of the increasing population, and fixing governance issues to reduce the unemployment rate in the South Asian countries.

South Asian countries are facing severe poor governance problem since the 1970s. Bad governance is a key element for the rising unemployment rate and slow development process in the South Asian countries. The current study investigates the poor governance issues in the South Asian countries and their influence on unemployment. Other dimensions such as population growth, credit supply, ICT, and human capital impact on unemployment have also been examined in this study.

The primary objective of this research is to investigate the economic variables and their relationship with the unemployment rate. The present study is of time-series panel data nature, for the time period 1994–2016. The study at hand collected annual data from WDI¹.

The findings show a negative and a positive impact on unemployment in the long run like governance shows a negative and significant relationship with unemployment in the long run. Internet users, mobile cellular subscription, and fixed broadband subscriptions also indicate a negative and significant relationship with the unemployment rate. On the other hand, population growth and financial activity show a positive and significant relationship with unemployment in the long run in South Asian countries.

5.2 Policy implications and recommendations

According to our findings, if the population will increase by 1 unit, then the unemployment rate will increase by 0.802420 units. So, in the light of our findings, it is clear that employment problems can only be created if the government does not put in place adequate measures to control the population and allocate resources equitably, giving a sense of belonging to all citizens. Therefore, to provide the controlled population with the necessary employment opportunities, it is necessary to allocate resources efficiently and to launch projects aimed at creating jobs. It has been observed that a 1 unit increase in credit volume increases the unemployment rate by 0.620559 units according to our results. It is concluded in the light of our results that more credit supply will lead to an increase in the unemployment rate. Hence, credit supply should be restricted or it should be accessible at a high-interest rate in the time of inflation to decrease in the aggregate demand.

Transparency or merit is the basis of good governance, and the very first step to achieving the goal of good governance is to fight against corruption. It provides a complete justification for providing good quality management records, financial controlling, and managerial systems. Governance is concerned with the practice of responsible social writings, editors working, and broadcasting of information by different means of communication.

Corruption in the society weakens the basic social value and challenges the rule of law and loss of trust in political organizations as well as institutions. All these scenarios create a business environment in the society, and in this type of business environment, only corrupt and dishonest people prosper. It destroys research as well as scientific works and weakens the professional activities. Corruption contributes largely to human misery and slows down development. Corruption is successful mostly in the environment of secrecy and illiteracy. All If 1 unit of governance improves the unemployment rate by 0.526023 units would decrease.

Investment in human capital and in the ICT shows a negative and significant impact on unemployment as an increase in investment on the human capital, i.e., education, also makes some policy to increase

¹ WORLD DEVELOPMENT INDICATORS

the investment in the ICT sector to reduce unemployment than it will be the wise decision in the light of current research. As if internet users will increase online buying and selling then the business activities will increase. Mobile cellular subscriptions will also increase the usage of online shopping and fast transactions of money through mobile applications, which will be the cause of more number of jobs in the ICT sector and a decline in the unemployment rate. In case of an increase in fixed broadband subscription, educated unemployed will try to get jobs through fast online job portals and they can easily access to the global market for selling their services online. So, an increase in the investment in fixed broadband subscriptions will also reduce the unemployment rate. Technology should be accessible to the common people, which can be the cause of ICT promotion in every corner of the country. However, along this technology, awareness campaigns and seminars should be launched for uneducated and less educated labor force according to the competitive market needs so that unemployment can reduce on the side of the people who are not well aware of IT skills.

References

- Bannaga, A., Gangi, Y., Abdrazak, R., Al-Fakhry, B. (2013), The effects of good governance on foreign direct investment inflows in Arab countries, *Applied Financial Economics*, Vol. 23, No. 15, pp. 1239–1247.
- Bojnec, Š., Fertoe, I. (2009), Impact of the Internet on manufacturing trade, *Journal of Computer Information Systems*, Vol. 50, No. 1, pp. 124–132.
- Campbell, J.Y., Ammer, J. (1993), What moves the stock and bond markets? A variance decomposition for long-term asset returns, *The Journal of Finance*, Vol. 48, No. 1, pp. 3–37.
- Chatterjee, D.D., Segars, A.H., Watson, R.T. (2006), Realizing the promise of e-business: developing and leveraging electronic partnering options, *California Management Review*, Vol. 48, No. 4, pp. 60–83.
- Christiansen, C., Schmeling, M., Schrimpf, A. (2012), A comprehensive look at financial volatility prediction by economic variables, *Journal of Applied Econometrics*, Vol. 27, No. 6, pp. 956–977.
- Chowdhury, M.S. (2017), Public forums for social accountability: a study of ward Shava and open budget system of 06 (Six) Union Parishads of Bangladesh, *Asian Journal of Governance and Development*, Vol. 2, No. 1, pp. 21–46.
- Dao, M.Q. (2012), Population and economic growth in developing countries, *International Journal of Academic Research in Business and Social Sciences*, Vol. 2, No. 1, p. 6.
- Bloom, D.E., Canning, D., Malaney, P.N. (2000), Population and development review, *Supplement: Population and Economic Change in East Asia*, Vol. 26, pp. 257–290.
- Dollar, D., Kraay, A. (2000), Growth is good for the poor, World Bank, DEC.
- Farid, A. (2015), *Good governance: an approach to improve external debt situation in Pakistan*, Doctoral Dissertation, University of Peshawar.
- Gatti, S. (2012), *Project finance in theory and practice: designing, structuring, and financing private and public projects*, Academic Press.
- Grimes, A., Ren, C., Stevens, P. (2012), The need for speed: impacts of internet connectivity on firm productivity, *Journal of Productivity Analysis*, Vol. 37, No. 2, pp. 187–201.
- Han, L., Fraser, S., Storey, D.J. (2009), Are good or bad borrowers discouraged from applying for loans? Evidence from US small business credit markets, *Journal of Banking & Finance*, Vol. 33, No. 2, pp. 415–424.
- Holt, L., Jamison, M. (2009), Broadband and contributions to economic growth: lessons from the US experience, *Telecommunications Policy*, Vol. 33, No. 10–11, pp. 575–581.
- Kaufmann, D., Kraay, A., Mastruzzi, M. (2009), Governance matters VIII: aggregate and individual governance indicators 1996–2008, The World Bank.
- Kaufmann, D., Kraay, A., Zoido-Lobaton, P. (2002), Governance matters II: updated indicators for 2000–01 (Vol. 2772), Washington, DC: World Bank Publications.
- Levin, A., Lin, C.F., Chu, C.S.J. (2002), Unit root tests in panel data: asymptotic and finite-sample properties, *Journal of Econometrics*, Vol. 108, No. 1, pp. 1–24.
- Legrain, P., Gillet, N., Gernigon, C., Lafreniere, M.A. (2015), Integration of information and communication technology and pupils' motivation in a physical education setting, *Journal of Teaching in Physical Education*, Vol. 34, No. 3, pp. 384–401.
- Pagano, M., Pica, G. (2012), Finance and employment, *Economic Policy*, Vol. 27, No. 69, pp. 5–55.
- Ordine, P., Rose G. (2009), Overeducation and instructional quality: a theoretical model and some facts, *Journal of Human Capital*, Vol. 3, No. 1(Spring), pp. 73–105.
- Resnick, D., Birner, R. (2006), Does good governance contribute to pro-poor growth? A review of the evidence from cross-country studies (No. 580-2016-39349).

- Sharif Razavian, A., Azizpour, H., Sullivan, J., Carlsson, S. (2014), CNN features off-the-shelf: an astounding baseline for recognition, in: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*, Washington, DC, USA, pp. 806–813.
- Sims, C.A. (1980), Macroeconomics and reality, *Econometrica: Journal of the Econometric Society*, Vol. 48, No. 1, pp. 1–48.
- Stock, J.H., Watson, M.W. (2012), Introduction to econometrics: global edition, Boston, MA: Pearson Education.
- Stock, J.H., Watson, M.W. (2012), Disentangling the Channels of the 2007-2009 Recession (No. 18094), Cambridge, MA: National Bureau of Economic Research.
- Thompson, H., Garbacz, C. (2008, June), Broadband impacts on state GDP: direct and indirect impacts, in: *International Telecommunications Society 17th Biennial Conference*, Canada.
- World Bank Group. (2014), World development indicators 2014, Washington, DC: World Bank Publications.