

# Nexus between Export Diversification and Economic Growth: A Case Study of Afghanistan

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## Abstract

Economic growth and acceleration of international trade has been a major concern for researchers all over the world. In this regard, this paper aims to investigate the relationship between export diversification and economic growth in Afghanistan. Economic growth in the long term is critical for Afghanistan to achieve political stability, self-reliance and sustainable economic development that have been, all together, committed to be implemented as part of the Sustainable Development Goals. This study used annual time series data for the period spanning from 2008-2018 to analyze the relationship between export diversification and economic growth in Afghanistan. In order to analyze the effects of export diversification on economic growth, VAR model has been applied. The estimated results denote that there is positive relationship between export diversification and economic growth in Afghanistan. Other explanatory variables like trade openness, gross domestic fixed capital formation is in favor of economic growth. It is recommended that measures should be taken towards the identification of new export markets by working closely with its regional counterparts to streamline the administrative requirements in the region to increase market access, put greater emphasis on the production of higher-value-added products and invest in human capital through education and training of skilled labor for high-value services.

**Keywords:** Afghanistan, Export Diversification, Economic Growth, Trade

JEL Classification: F10, F13, F21, F24

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## **Introduction**

Economic growth and acceleration of international trade has been a major concern for researchers all over the world. The term trade refers to buying and selling of goods and services both within an economy among producers and consumers, and internationally between/among different nations. International trade allows nations to expand markets for goods and services which are not available in their own countries (Hesse, 2009). The relationship between trade and economic growth as an old phenomenon, dates back to Smith (1776) with an emphasis on trade as a hatch for surplus production and a mean of broadening the market through division of labor and specialization in production of commodities' a nation has comparative advantage in. Furthermore, Marshal (1890) admitted that economic growth of nations belongs to the study of international trade. The new era of globalization has paid a larger amount of interest not only in trade diversification and openness, but also on the effects of technological revolution on intensive trade integration that has caused an average increase of 7 percent per year in the value of merchandise trade across the globe between 1980-2011 (WTO, 2013).

Afghanistan, a land-locked, war-torn and aid-dependent country has been suffering a seemingly internal war for over the past 40 years. The war has taken away all of the country's properties and ruined the economic infrastructures, the worst of which happened to be the era of Taliban when Afghanistan had limited international relations with few countries across the world. After the fall of Taliban Emirate in 2001, the new era started and government of Afghanistan was officially recognized by many countries around the world and its international relations was revitalized. Since 2001, Afghanistan has made steady progress in reconstituting and reforming economic system (Farahmand & Esen, 2020). Following the adoption of 2004 constitution, Afghanistan's traditional economy was replaced by market economy (AFG. Const. art. X, S 1.).

Owing to the facts above, economic growth in the long term is critical for Afghanistan to achieve economic stability that have been, all together, committed to be implemented as part of the Afghanistan Sustainable Development Goals. Especially A-SDGs 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all) and A-SDG 12 (Ensure sustainable consumption and production patterns) which are mostly relevant to sustainable consumption, production and promotion of inclusive sustainable economic growth. The aforementioned sustainability could be ensured by diversified exports

which will in turn help increase aggregated demand and cause higher economic growth.

Diversification divides the risks of investment on a wider portfolio of economic segments that ultimately increases income of citizens. Diversified exports require ensured products' quality and standards which will in turn open regional and international market opportunities for Afghan exporters and will result in enhanced competitiveness, access to market and brand recognition (Acemoglu *et al.*, 1997). Consequently, gaining market share will generate new business opportunities and create new job opportunities within Afghan community which will result in attaining A-SDGs.

Though Afghanistan has been committed to the achievement of Sustainable Development Goals (SDGs) after 2015, it has been facing the problem of low and volatile economic growth for the past decade. The idea has been that diversification of exports will lead to development and higher economic growth. But this statement has remained theoretical for a long time. Though empirical literature explains the amount of growth which could be induced by exports in the context of other countries, in case of Afghanistan, export has been very little or no diversified. This paper fills the gap that exists in the literature from the standpoint of Afghanistan, where there is the lack of empirical evidences related to the impact of export diversification on economic growth. This paper tries to answer the following questions: What is the relationship between export diversification and economic growth in Afghanistan? And, what is the impact of export diversification on economic growth?

The rest of the study is divided into four sections with second section describing the review of literature, section three includes research methodology which is followed by section four describing results and discussions. The last section concludes the study along with recommendations.

## **2. Literature Review**

The main objective of this section is to review the relevant literature about export diversification and economic growth. This section has been organized into three sub-sections. The first of which describes the theoretical literature that explain export diversification. The second one describes the empirical review of the literature and the third one explains the conceptual framework and conclusion.

## 2.1. Theoretical Literature

There are two ideological perspectives related to trade which are export diversification and specialization (concentration). Classical trade theorists are mostly in favor of specialization while contemporary trade theorists are in favor of diversification (Hodey *et al.*, 2015; Osakwe, 2007; Turnovsky, 1974). Bebczuk and Berrettoni (2006) explain that there is no unified theoretical framework which could explain the driving forces of export diversification at the macroeconomic level, while the benefit of export diversification has been explained in almost each literature. Export diversification is considered as a means of widening a nation's comparative advantage in order to reduce the uncertainty regarding the export earnings for a less developed country (Yokoyama and Alemu, 2009). Furthermore, Ali *et al.* (1991) explain export diversification as change in the composition of a country's existing product mix. Berthelemy *et al.* (2000) define export diversification as the spread of production over many sectors. Dennis and Shepherd (2007) define export diversification as widening the range of products that a country exports. Bachetta *et al.* (2012) explain export diversification as an increase in the number of destination markets.

Cabral and Veigo (2010) found better governance as an important determinant for successful export diversification in Sub-Saharan Africa. They further found that level of transparency, accountability and corruption are known to be important factors in promoting or limiting export diversification and export sophistication. Increase in human capital promotes export diversification and export sophistication in SSA and human capital is positively related to export diversification and export sophistication. They also found that ED and ES are linked to growth and economic stability in SSA. Dogruel and Tekce (2011) studied the patterns of export diversification and growth dynamics in MENA countries with the effects of trade openness on export diversification. Their findings indicate that the countries which are not dependent to the export of fossil oil, they have managed to increase export diversification. Owan *et al.* (2020) investigated the impact of diversification on the economic growth in Nigeria focusing on GDP growth rate, investment and exchange rate. The authors found the positive and significant impact of non-oil GDP on economic growth while non-oil export and investment had a positive but insignificant impact on economic growth in Nigeria.

Hodey *et al.* (2015) have examined the effect of export diversification on economic growth in Sub-Saharan Africa (SSA) testing the hypothesis of a hump-shaped relationship between export diversification and economic growth in SSA. The major conclusion of their research suggests that export

diversification has positive effect on economic growth but there is no evidence of non-monotonic relationship between export diversification and economic growth in Sub-Saharan Africa. Burciu *et al.* (2020) studied Romania and V4 countries (Czechia, Hungary, Poland and Slovakia) targeting to estimate the relative significance of exports with different technological contents on economic growth. The authors have used panel data analysis and regression models for the period of time between 1995-2017 for the aforementioned economies. The results of their study reveal different effects of exports on economic growth in the mentioned countries characterized by country-specific factors. The authors further conclude their study with an emphasis on the decisive role of exports in economic growth in those countries.

## 2.2. Empirical Literature

Claverkouakou and N'Zué (2020) have empirically investigated the relationship between export diversification and economic growth in Cote d'Ivoire. They have found a positive relationship between export diversification and economic growth in the short run, while their study reveals a negative relationship between variables in the long run, while (Benli, 2020) finds from the empirical data that there is no long-term relationship between exports diversification and economic growth which is in conflict with lots of previous literatures. The relationship between export diversification and economic growth among ASEAN countries was investigated by (Hinlo and Arranquez, 2017) focusing on 5 countries (Malaysia, Indonesia, Philippines, Thailand and Singapore). The authors found a bidirectional relationship between export diversification and economic growth for Malaysia and a unidirectional relationship between variables for Philippines while for the remaining 3 countries no causalities were found.

Sannasse *et al.* (2014) investigated the interplay between economic growth and export diversification in Mauritius for a period of 30 years. Their findings of the empirical exercise reveal that there has been positive correlation between export diversification and GDP per capita in Mauritius. Though export diversification continued to fluctuate, economic growth has increased progressively over the above mentioned time period. Their investigation further reveals that Mauritius, besides having an increase in export diversification, had an increase in real GDP per capita over three decades. Mania and Rieber (2019) studied the relationship between export diversification and economic growth in 54 countries of three regions including Latin America, Sub-Saharan Africa and Developing Asia. Their conclusion reveals a positive contribution of export diversification to

economic growth especially in developing countries. Furthermore, the link between export diversification and economic growth has been examined by Nwosa *et al.* (2019). The authors have found that export diversification has positive but insignificant relationship with economic growth in Nigeria, while in GCC, (Bashayreh *et al.*, 2019) analyzed the short run and long run effects of export diversification on economic growth for Gulf Cooperation Council countries. The results of the research show a positive significant long run relationship between export diversification and economic growth while in the short run it does not support any other prior studies. The results also reveal a significant impact of trade openness on economic growth. Therefore, GCC countries are to include export diversification in their policies in order to secure the stability and sustainability of their GDP level growth in the future.

Braynen and Thurman (2019) examined the relationship between economic growth and export diversification in 100 Small Island Developing States (SIDS) from 1995 to 2007. Their findings show a non-linear, U-shaped relationship between export diversification and economic growth in the mentioned economies, while U-shaped relationship was moderated by the size of population in the mentioned states. In terms of patterns of export diversification (Alshomaly and Shawaqfeh, 2020) examined the relationship between patterns of export diversification and economic growth in West Asian Arab Countries. Their findings indicate that economic growth was positively affected by Human Capital and Primary Products' export growth while economic growth was negatively affected by Trade Openness and Population Growth. Lugeiyamu (2016) examined the effects of export diversification and trade openness on economic growth in Africa for the period spanning from 1998-2009. Findings of the research show that countries with diversified exports experience faster economic growth while trade openness (TOP) was found not to be a robust determinant of economic growth in Africa. Gibescu (2010) analyzed the relationship between economic growth and gross fixed capital formation in Romania, Czech Republic, Bulgaria, Poland and Hungary for the period spanning from 2003-2009. The results show positive relationship between GFCF and economic growth and positive influence of GFCF on economic growth in the context of Romania, Bulgaria, Czech Republic and Poland excluding Hungary.

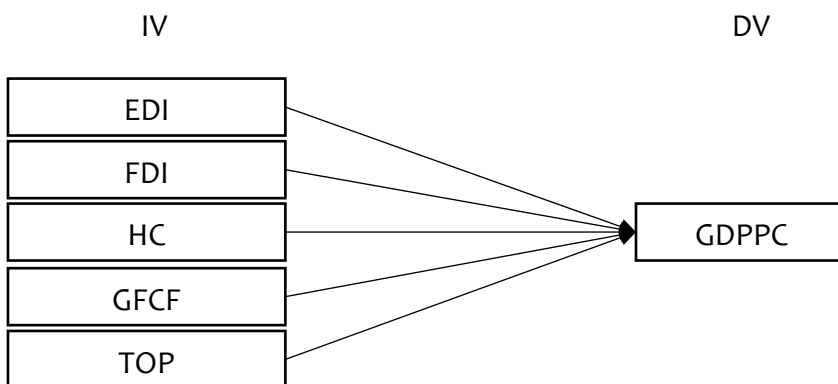
Iftikhar *et al.* (2016) studied the relationship between economic growth, exports and gross fixed capital formation (GFCF) in Pakistan. Findings reveal that there is long-run positive relationship between GFCF and economic growth in Pakistan. The results reveal a negative relationship between

economic growth and exports and the reason for which might be that exports decrease domestic consumption. Furthermore, (Duru and Ehidiamhen, 2018) found that export diversification has a positive and insignificant relationship with economic growth. They also found that TOP has negative insignificant influence on economic growth. Their finding indicate that GFCF has positive significant relationship with economic growth. They concluded that export diversification and gross fixed capital formation were known to be determinants of economic growth while trade openness was not. Noreen and Mahmood (2014) assessed the trend of export diversification and examined the relationship between export diversification and explanatory variables in ASEAN and SAARC countries over the period from 1986-2012. They found that FDI, GFCF, Competitiveness and FSD are positively and significantly related to export diversification in both regions. Their policy suggestion include attraction of both FDI and GFCF through investment promotion and facilitation initiatives in the both regions.

### 2.3. Conceptual Framework

Based on a comprehensive review of literature, the following conceptual framework has been developed. The theory demonstrates that EDI, FDI, HC, GFCF and TOP as independent variables have impact on GDPPC. Through development of this conceptual framework, this study contributes to the pool of knowledge and research in this specific area which has not been yet done in the context of Afghanistan.

**Figure 1: Conceptual Framework**



**Note:** (GDPPC) stands for Gross Domestic Product per capita, (EDI) stands for Export Diversification Index, (FDI) stands for Foreign Direct Investment, (HC) stands for Human Capital, (GFCF) stands for Gross Fixed Capital Formation and (TOP) stands Trade Openness

Source: Adapted from (Hodey, 2015; Sannasse, Seetanh and Lamport, 2014)

Based on the reviewed literature on the relationship between economic growth and explanatory variables (Export Diversification, Foreign Direct Investment, Human Capital, Physical Capital and Trade Openness), there are indications that export diversification has a positive monotonic relationship with economic growth in some countries while in some other countries the literatures show non-monotonic relationship between the mentioned variables. Literatures also suggest positive relationship between economic growth and FDI. There are also indications of positive relationship between economic growth and Human Capital. It has been indicated that trade openness has positive relationship with economic growth. The ambiguity in the literature regarding the functional relationship between export diversification and economic growth required further researches to provide new evidence using the updated data. Therefore, this study aims to provide further evidences on the relationship between export diversification and economic growth in Afghanistan. The above literatures also indicate that economic growth is significantly influenced by export diversification in some countries while in others show no effect.

**Table 1: Explanatory Variable and Their Expected Signs**

Variable	Indicator	Expected Sign of Coefficient
Economic Growth	GDP Per capita (constant 2012)	Positive
Export Diversification	Export Product Diversification index	Positive / Negative
Foreign Direct Investment	Net FDI as a percentage of GDP	Positive
Human Capital	Gross Secondary School Enrollment	Positive
Physical Capital	Gross fixed capital formation as percentage of GDP	Positive / Negative
Trade Openness	Ratio of total trade to GDP	Positive

Source: Adapted from (Gbolonyo, 2019; Hodey et al., 2015)

### 3. Research Methodology

This section explains the techniques used to determine the relationship between export diversification and economic growth in Afghanistan which includes empirical estimation model, variables and data sources. The research design adopted for data analysis in this study, follows the quantitative approach. Time series data for the period spanning from 2008-2018 has been used to analyze the relationship between export diversification and economic growth in Afghanistan. The data for all variables have been extracted from World Bank, WDI, WITS, Trading Economics and UNCOMTRADE.



### 3.1. Definition and Measurement of Variables

Selection of explanatory variables in this study has been done based on the existing empirical studies and economic theories. This study includes six variables viz; Gross Domestic Product Per Capita (GDPPC), Export Diversification Index (EDI), Foreign Direct Investment (FDI), Human Capital (HC), Gross Fixed Capital Formation (GFCF) and Trade Openness (TOP).

*Gross Domestic Product Per capita (GDPPC)*: A country's economic growth is measured by GDP per capita and GDPPC growth is known as the proxy for development level of a country or the development level of a nation's standard of living (Aghion, 1992 and Fiorillo, 2001). The authors further suggest that consumption preference patterns change as the GDP per capita grows in a country.

**Export diversification**: It has been explained in different ways by different authors. For instance; Ali *et al.* (1991) explain export diversification as change in the composition of a country's existing product mix. Berthelemy *et al.* (2000) define export diversification as the spread of production over many sectors. Dennis and Shepherd (2007) define export diversification as widening the range of products that a country exports. Bachetta *et al.* (2012) explain export diversification as an increase in the number of destination markets. Balavac (2012) states that conceptual definition of diversification is derived from the way diversification is measured. For instance; the concentration indexes measure whether the majority of a country's earnings come from small range of export products or the source of export earnings are more evenly spread across a given range of export goods. Export diversification index is calculated as below:

$$ED_{it} = \frac{\sum |h_{ij}|h_i|}{2}$$

Where  $h_{ij}$  is the share of commodity  $i$  in the total export of country  $j$  and  $h_i$  is the share of commodity  $i$  in world exports.

**Foreign Direct Investment (FDI)**: Defined as an investment involving long term relationship between individuals and firms from one country into another country (OECD, 1996). There are controversies about the effects of FDI on economic growth in literatures. Carkovic *et al.* (2005) explain that FDI inflow has been increasing in developing nations and they are implementing FDI inducing policies to attract foreign investment. FDI is expected to have positive effect on economic growth due to its ability to increase competition in the domestic economy while introduction of FDI in domestic economy may result in changes of prices and financial markets which are detrimental to resource allocation and subsequently slows growth. Alfaro *et al.* (2004)

suggest that FDI would only induce growth when there are efficient domestic financial markets, skilled labor and proper level of education, are available in the domestic economy. FDI is measured by Net FDI inflows as percentage of GDP.

**Human capital:** It affects the national income growth in the same way as increased personal human capital yields individual economic growth (Mincer, 1981). The author further argues that human capital has more contribution to economic growth comparing to physical capital. There are empirical evidences that human capital has positive effect on growth (Mankiw *et al.*, 1992; Mincer, 1981). While the study of Alshomaly and Shawaqfeh (2020) reveals negative relationship between economic growth and Human Capital in West Asian Arab Countries and South Africa respectively. Human capital is commonly measured by gross secondary school enrollment.

**Gross Domestic Fixed Capital Formation (GFCF):** It is defined as the major component of domestic investment and a vital process in acceleration of economic growth (Sanusi and Meyer 2019). According to the predictions of Augmented Solow growth model, Physical Capital would raise the steady state of capital per worker which will result in increased output per effective worker and thereafter, increased growth (Hodey *et al.*, 2015). The significant positive effects of increased physical capital on growth has been empirically demonstrated by (Mankiw *et al.*, 1992). Physical capital is estimated by gross fixed capital formation as percentage of GDP in most of growth estimation models.

**Trade openness:** It is considered as an extent to which a country is flexible and accessible to foreign investment and international trade. The degree of trade openness is measured by the actual size of registered imports and exports of a country excluding illicit trade. Trade openness is an expression of how free or strict a country is in its trade relations with the outside world (Chen and Gupta, 2009; Gbolonyo, 2019). Trade openness is measured by ratio of total trade to GDP.

### 3.2. Empirical Model

Following the existing empirical models applied by Yokoyam and Alemu (2009); Gbolonyo (2019); Hesse (2009); and Hodey *et al.* (2015) few modifications have been applied based on the explanatory variables in previous section, therefore, the model to be estimated is written as;

$$GDPPCG_{i,t} = \alpha_1 GDPPC_{i,t-1} + \alpha_2 GFCF_{it} + \alpha_3 ED_{it} + \alpha_4 ENROL + \alpha_5 FDI_{it} + \alpha_6 TOP_{it} + \theta_{i,t}$$

Where

- $GDPPC_{it}$  is the GDP per capita growth
- $i$  indexes the country under study
- $t$  explains the years of study
- $GFCF_{it}$  is the gross fixed capital formation which is used as proxy for domestic investment.
- $ED_{it}$  is the export diversification index which represents three measures (export product diversification, export product concentration and the number of export products)
- $ENROL_{it}$  is the gross secondary school enrolment rate which measures human capital
- $FDI_{it}$  is the foreign direct investment
- $TOP_{it}$  is the trade openness and  $\theta_{it}$  is the idiosyncratic error term.

**Table 2: Representation of the Variables 2008-2018**

Variable	2008	2010	2012	2014	2016	2018
<b>GDPPC</b> (in US \$)	365	543	642	614	547	524
<b>EDI</b> (%)	0.14	0.15	0.24	0.27	0.24	0.31
<b>FDI</b> (in Million US\$)	40.35	190.77	56.82	42.98	93.59	139.20
<b>HC</b> (%)	38.09	50.56	53.61	52.58	51.65	55.42
<b>TOP</b> (%)	49.66	52.58	60.78	49.95	43.71	49.24
<b>GDFCF</b> (% of GDP)	18.86	17.86	16.81	18.05	17.70	17.50

**Note:** The abbreviations used in the above table stand for the terms in brackets respectively GDPPC (Gross Domestic Product Per Capita), EDI (Export Diversification Index), FDI (Foreign Direct Investment), HC (Human Capital), TOP (Trade Openness) and GDFCF (Gross Domestic Fixed Capital Formation).

Source: Adapted from Trading Economics

## 4. Results and Discussions

This section presents the estimation and discussion of the results. E-Views statistical package version 8.0 was used for calculation of the empirical estimations.

### 4.1. Results

It is commonly argued that not only the level of exports leads to economic growth, but also the degree of export diversification matters. Advocates of such an opinion have emphasized on the commonness of the diversification features as a major contributor to economic growth.

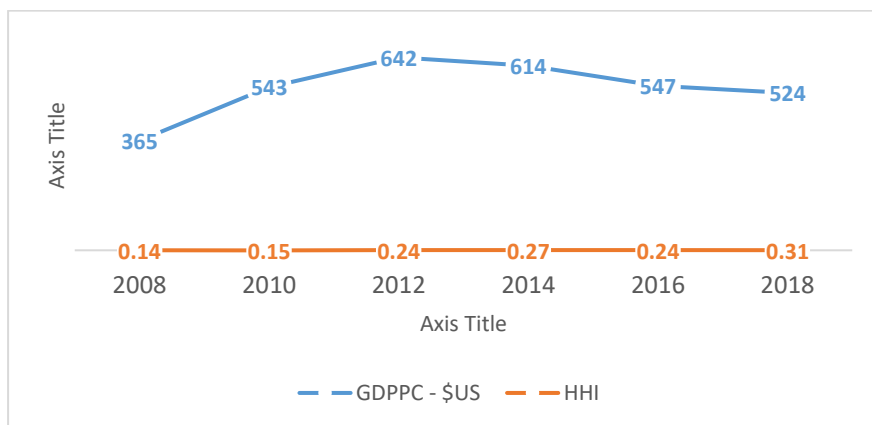
Claverkouakou & N’Zué (2020) found a positive relationship between export diversification and economic growth in the short run in Cote d’Ivoire while in the long-run, their analysis shows a negative relationship. Furthermore, findings of Vahalik (2015) indicates that export diversification has a positive effect on economic growth in developing countries. But investigations of Bashayreh *et al.*, (2019) reveal a positive significant relationship between export diversification and economic growth in the long-run and contradicts the findings of prior researches in the context of Gulf Cooperation Council (GCC) countries.

In the current analysis, inspiring from the above insights, the link between export diversification and economic growth has been discussed in the context of Afghanistan a land-locked country in Asia. Despite being a land-locked country, Afghanistan has been able to diversify its exports to some extent.

**4.1.1. Trend analysis of GDP Per Capita and Export Diversification**

As illustrated in figure 1, Hirschman Herfindahl Index (HHI) value is 0.14 in 2008 and GDPPC in Afghanistan is \$365 in the same year. The trend shows that as HHI increases to 0.15, GDP per capita increases to \$543 and consequently HHI increases to 0.24 and GDP per capita increases to \$642. To sum up, as HHI increases, GDP per capita also fluctuates higher which denotes that export diversification has direct positive relationship with economic growth in Afghanistan in the period spanning from 2008-2018. The above finding is supported by (Agosin, 2007; Duru and Ehidihamen, 2018; Naude and Rossouw, 2008; Noureen and Mahmood, 2014).

**Figure 1: Evaluation of Export Diversification and GDP Per Capita in Afghanistan 2008-2018**



Source: Author’s calculation

#### 4.1.2. Share of Total Exports of Afghanistan

As illustrated in Table 3, Afghanistan has exported 6 commodities consistently throughout the years from 2008-2018 from which Raw Materials and Vegetables account for 34.05 percent and 46.91 percent respectively in 2018. The mentioned table also shows that Afghanistan exported only 6 commodities (broad category) from 2010 to 2014 while the number of export commodities increased to 10 (broad category) in 2016 after the accession to WTO. The number of export commodities increased to 20 in 2018 which denotes a wider range of export product diversification. As shown in Table 4, Afghanistan has diversified its exports both horizontally and vertically since 2016. In 2012 Afghanistan could export only 5 products to 7 destinations while it increased to 42 products to 48 destinations in 2016 and continued to increase to 156 products to 62 destinations in 2018.

**Table 3: Share of total Exports of Afghanistan in Million US dollar (2008-2018)**

Product Group	2008	2010	2012	2014	2016	2018
Capital goods	2.88	-	-	-	-	0.11
Consumer goods	15.02	13.08	21.98	20.99	6.5	3.86
Intermediate goods	0.44	0.95	-	-	0.35	1.61
Raw materials	29.62	27.39	3.75	1.65	37.89	34.05
Animal	0.37	0.23	0.18	0.04	0.36	0.33
Chemicals	-	-	-	-	-	0.19
Food Products	0.14	-	-	-	0.01	0.45
Footwear	-	-	-	-	-	0.01
Fuels	-	-	-	-	-	6.10
Hides and Skins	0.28	-	-	-	-	1.03
Mach and Elec	-	-	-	-	-	0.09
Metals	-	-	-	-	-	0.30
Minerals	-	0.16	-	-	0.62	0.72
Miscellaneous	6.95	17.15	48.55	54.72	10.52	0.06
Plastic or Rubber	-	-	-	-	-	0.01
Stone and Glass	0.44	0.94	-	-	-	0.01
Textiles and Clothing	14.42	10.56	12.60	11.39	3.61	3.95
Transportation	-	-	-	-	-	0.16
Vegetable	29.44	29.54	12.95	11.21	40.12	46.91
Wood	-	-	-	-	0.01	0.03
Total	100	100	100	100	100	100

**Note:** (-) dashes in the cells denote that the product was not exported during the year in the column.

Source: Calculation from UNCOM Trade

**Table 4: Number of Product Categories, Products and Export Partners (2008-2018)**

Year	Products' Category	Product	Partner
2008	11	33	34
2010	10	32	40
2012	6	5	7
2014	6	5	7
2016	11	42	48
2018	20	156	62

Source: Author's Calculation from UNCOM Trade

## 4.2. Co-integration and Model Assumptions

The current study evaluated the long-run relationship between GDPPC as dependent variable with EDI, FDI, GFCF, HC and TOP as separate independent variables. The estimation of (error correction terms) through the use of (error correction models) allows us to analyze the speed of the country's adjustment to the long-run equilibrium.

**Table 5: Long-run relationships (estimated co-integration vector)**

Variable	Coefficient	t-ratios
GDPPC	1	
EDI	-136.96	-0.84
TOP	6.32	2.39
HC	15.67	5.25
FDI	-0.44	-1.74
GDFCF	14.11	0.89

Source: Authors' calculation through E-Views 8.0.

As illustrated in Table 5, the negative sign for export diversification index conforms the priori expectation of this research which denotes that there is positive relationship between export diversification and economic growth. TOP, HC and GDFCF are also found to be in the favor of GDPPC while FDI is not.

### 4.2.1. Residual Diagnostic Test

Regression is based on certain assumptions which refer to normal distribution of residuals, correlation between error terms, constant variance of residuals and correlation between variables. All the tests indicate that the model is proper to be used in the current paper.

#### a) Actual Fitted Residuals

Actual Fitted and Residuals Table shows that if the predicted line falls above a point, the dependent variable has been over-predicted and the

result is negative. If the line is beneath a point, it implies that the dependent variable is under-predicted and the result is positive.

**Table 6: Actual Fitted Residuals Table**

Obs.	Actual	Fitted	Residual	Residual Plot
2008	365.000	391.547	-26.5475	. *   .
2009	435.000	447.036	-12.0358	. *   .
2010	543.000	524.647	18.3531	.   * .
2011	591.000	588.712	2.28751	. * .
2012	642.000	647.181	-5.18150	. *   .
2013	637.000	640.301	-3.30088	. *   .
2014	614.000	600.306	13.6938	.   * .
2015	578.000	535.126	42.8741	.   . *
2016	547.000	512.886	34.1139	.   * .
2017	556.000	550.128	5.87229	.   * .
2018	524.000	566.614	-42.6136	* .   .

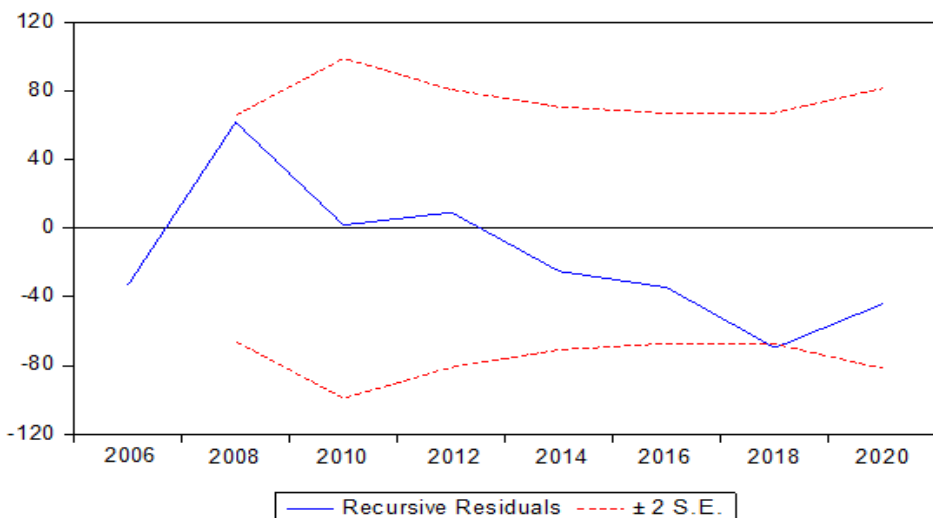
Source: Calculation through E-Views 8.0.

As shown in Table 6, the dots are randomly dispersed, so linear regression model is preferred for this data set.

#### b) Recursive Residuals:

A residual plot shows that how much a regression line vertically misses the data point.

**Figure 2: Recursive Residuals Plot**



Source: Adapted from E-Views 8.0.

As shown in Figure 2, the recursive residual plot clearly indicates stability in the equation during the sample period.

**c) Autocorrelation Test**

In this study, Breusch-Godfre Serial Correlation LM Test has been applied to test the correlation between GDPPC and other variables (EDI, FDI, GFCF, HC and TOP).

**Table 7: Autocorrelation Results using Breusch-Godfre Serial Correlation LM Test**

<b>Breusch-Godfrey Serial Correlation LM Test:</b>				
F-statistic	2.924595	Prob. F (2,6)	0.1298	
Obs*R-squared	7.404544	Prob. Chi-Square (2)	0.0247	
Test Equation:				
Dependent Variable: RESID				
Method: Least Squares				
Date: 11/05/20 Time: 18:07				
Sample: 2008 2018				
Included observations: 11				
Pre-sample missing value lagged residuals set to zero.				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	-139.0906	365.1599	-0.380903	0.7164
EDI	206.0785	158.7809	1.297880	0.2420
FDI	-0.082374	0.226368	-0.363891	0.7284
GDFCF	6.285422	13.31818	0.471943	0.6536
HC_____	0.388839	2.474094	0.157164	0.8803
TOP	-0.451644	2.295238	-0.196774	0.8505
RESID (-1)	0.271155	0.379915	0.713726	0.5022
RESID (-2)	-1.143648	0.493245	-2.318623	0.0596
R-squared	0.493636	Mean dependent var	-3.33E-13	
Adjusted R-squared	-0.181515	S.D. dependent var	31.20173	
S.E. of regression	33.91551	Akaike info criterion	10.16933	
Sum squared resid	6901.570	Schwarz criterion	10.59416	
Log likelihood	-67.26998	Hannan-Quinn criter.	10.16481	
F-statistic	0.731149	Durbin-Watson stat	1.812995	
Prob(F-statistic)	0.668105			

Source: Calculation through E-Views 8.0.

As shown in Table 7, the Durbin-Watson stat value= 1.812885 represents there is mild positive autocorrelation between GDPPC and other variables.

**d) Multi-collinearity**

This study used Variance Inflation Factor to test multi-collinearity. The Variance Inflation Factors (VIF) quantifies the extent of correlation between one predictor and the other predictor in a model. It is used for diagnosing collinearity/multi-collinearity. Higher values signify that it is difficult to



impossible to assess the contribution of predictors to a model accurately. The VIF value equal to 1 denotes that the predictor is not correlated. The VIF value between 4-5 denotes that the predictors moderate to high correlated. The VIF value equal to 10 or higher denotes that predictor is highly correlated.

**Table 8: Multicollinearity Test using Variance Inflation Factors**

Variance Inflation Factors			
Date: 11/05/20 Time: 18:05			
Sample: 2008 2018			
Included observations: 11			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	182288.0	1604.922	NA
EDI	26561.46	14.75629	2.811881
FDI	0.063754	10.90891	3.166640
GDFCF	249.0465	756.1733	7.234660
HC_____	8.887988	183.7500	4.356084
TOP	6.970404	149.3555	1.962765

Source: Calculation through E-Views 8.0.

Table 8, shows the values for EDI (2.8), FDI (3.1) and TOP (1.9) are smaller than 4 which denotes that they are not correlated while the values for GDFCF (7.2) and HC (4.3) denote that they are moderately correlated.

#### 4.3. Empirical Model

The empirical model employed for this study is Vector Autoregression Model (VAR) which is used to determine the relationship among several variables. VAR model has been used in this study because it is one of the most powerful, flexible and reliable method for analyzing a multivariate time series data. Its structure is that each variable function as linear function of its past lags and the past lags of other variables. VAR is run with a chosen number of lags with standard error and respective t-statistics are calculated to assess statistical significance. The relationship among GDPPC as dependent variable and EDI, FDI, HC, GDFCF and TOP as independent variables have been assessed in this study to prove the significance of their interrelationship statistically.

**Table 9: Vector Autoregression Test Results**

Vector Autoregression Estimates	
Date: 11/05/20 Time: 17:25	
Sample (adjusted): 2008 2018	
Included observations: 11 after adjustments	

Standard errors in ( ) & t-statistics in [ ]	
	GDPPC
GDPPC(-1)	0.535886 (0.41391) [ 1.29470]
GDPPC(-2)	-0.100093 (0.49441) [-0.20245]
C	-19.68919 (1196.40) [-0.01646]
EDI	-132.1838 (156.860) [-0.84269]
FDI	-0.072082 (0.51184) [-0.14083]
GDFCF	-6.695422 (49.8279) [-0.13437]
HC_____	6.836744 (11.2311) [ 0.60874]
TOP	4.685369 (3.11311) [ 1.50504]
R-squared	0.966884
Adj. R-squared	0.900653
Sum sq. resids	3815.803
S.E. equation	30.88609
F-statistic	14.59853
Log likelihood	-55.37892
Akaike AIC	9.904449
Schwarz SC	10.29557
Mean dependent	528.0000
S.D. dependent	97.99065

Source: Calculation through E-Views 8.0.

As shown in Table 9, (t-statistic) is the coefficient divided by its standard error and coefficient values are often larger than its standard error values. T-values measure the statistical significance of an independent variable (EDI, FDI, HC, GDFCF and TOP in this study) in explaining the dependent variable

(GDPPC in this study). In all the cases the (t-statistics) values are smaller than 2. This suggests that the relationship among variables are insignificant.

## 5. Discussion

Findings on the relationship between economic growth measured as GDP per capita and other explanatory variables (Export Diversification, Gross Fixed Capital Formation, Human Capital, Foreign Direct Investment and Trade Openness) are discussed in detail below:

As illustrated in Table 5, the negative value for Hirschman Herfindahl Index (HHI) is interpreted in opposite ways regarding diversification and concentration. Negative sign of concentration denotes positive sign of diversification (Lugeiyamu, 2016). Based on the findings of the analysis, there is positive relationship between export diversification and GDP per capita growth (economic growth) in Afghanistan in the long-run. The above findings are supported by many previous studies like, Bashayreh *et al.*, (2019) who studied Gulf Cooperation Council Countries and found a positive long term relationship between economic growth and export diversification. Furthermore, (Alshomaly and Shawaqfeh, 2020) who studied West Asian Arab Countries concluded the same result that reveals positive relationship between export diversification and economic growth. Bebczuk and Berretoni (2006) who studied Argentina, concluded that there is positive relationship between economic growth and export diversification only at low income level. Nwosa *et al.* (2019) who conducted the research in Nigeria state the same result of positive relationship between economic growth and export diversification. In addition to above studies (Sannasse *et al.*, 2014) who studied Mauritius, have found positive relationship between economic growth and export diversification. Among others, (Al-Marhubi, 2000; Alemu, 2009; and Hesse, 2009; Naude and Rossouw, 2008) found positive relationship between export diversification and economic growth while the above mentioned studies contradicts the findings of Claverkouakou & N'Zué (2020) who found a negative relationship between export diversification and economic growth in the long-run in Cote d'Ivoire (a West African county).

As previously mentioned, GFCF is the major component of domestic investment which accelerates economic growth (Sanusi and Meyer 2019). The augmented Solow growth model predicts a negative relationship between GFCF and economic growth. Finding of this research conforms the priori expectation (positive sign for GFCF) as shown in Table 5, while it contradicts the augmented Solow growth model. This finding is supported by Sanusi and Meyer (2019) who found positive long-run relationship

between economic growth and Gross Fixed Capital Formation in South Africa, Gibescu (2010) who found a positive relationship between economic growth and GFCF in Romania, Bulgaria, Czech Republic and Poland, Iftikhar et al. (2016) also found positive long-run relationship between economic growth and gross fixed capital formation in Pakistan. Furthermore, Mankiw et al. (1992) empirically prove that GFCF has significant positive effect on economic growth. Therefore, the GFCF had a crucial role in the economic growth of Afghanistan between 2008-2018.

The positive relationship between human capital and economic growth which was expected by this research has been confirmed by the empirical findings. This finding is also supported and replicated by prior studies (Al-Mahrubi, 2000; Hesse, 2009; Mankiw et al., 1992) who also found a positive relationship between human capital and GDP per capita growth. Mincer (1981) states that human capital has positive contribution to economic growth. Furthermore, Yokoyam and Alemu (2009) see human capital development as a long-term process in an economy which enhances the innovative capability of the mentioned economy and result in economic growth. Alshomaly and Shawaqfeh (2020) found that economic growth was positively affected by Human Capital.

As illustrated in Table 1, expected sign for FDI is positive which denotes that the negative sign of FDI (illustrated in Table 5), does not conform the priori expectation of this research. This means that FDI has negative long-run relationship with economic growth in the context of Afghanistan. This finding is supported by Carkovic and Levine (2005) who argue that FDI might result in alterations of prices and financial markets which will slow economic growth. The finding is also supported by (Moran et al., 2005) while (Alfaro et al., 2004) found positive effect of FDI on economic growth.

As illustrated in Table 1, expected sign for TOP is positive and the positive sign of TOP (illustrated in Table 5), conforms the priori expectation of this research. This finding is supported by the study conducted by Balavak and Pugh (2016) who found a positive relationship between economic growth and TOP. Alshomaly and Shawaqfeh (2020) found that economic growth was negatively affected by TOP in West Asian Arab Countries which is also supported by Lugeiyamu (2016) who found that TOP is not a robust determinant of economic growth in Africa.

In conclusion, the co-integration and vector correction model has been applied which denotes positive relationship between export diversification and economic growth. Jarcque-Bera test shows that the residuals are normally distributed and actual fitted residuals table shows that linear

regression model is preferred. Further, Recursive residual plot indicates stability in the equation during the sample period. Applied vector auto regression model in this study denotes that relationship amongst variables are insignificant and Variance Inflation Factors (VIF) test of multicollinearity in the current study denotes that EDI, FDI and TOP are not correlated while GDFCF and HC are moderately correlated.

Finally, the results show the existence of positive long-run relationship between export diversification and economic growth, HC and economic growth, TOP and economic growth while FDI has negative long-run relationship with economic growth in Afghanistan. The results also reveal that GFCF has a positive effect on economic growth in Afghanistan.

## 6. Conclusion and Recommendations

Economic growth and acceleration of international trade has been a major concern for researchers all over the world. The literatures on the topic show that developing countries such as East Asian Countries which diversified their exports either horizontally or vertically, could achieve higher growth rate, though they were at the same growth levels with Sub-Saharan Africa 50 years back (Alemu, 2009; Hodey *et al.*, 2015). The main objectives of this research is to identify the relationship between export diversification and sustainable economic growth in Afghanistan and to investigate the impacts of export diversification on sustainable economic growth in the country. Findings of this research show a positive relationship between export diversification and economic growth in Afghanistan from 2008 to 2018 which is also supported by (Bashayreh, *et al.*, 2019; Mania and Rieber, 2019; Nwosa *et al.*, 2019; Sannasee *et al.*, 2014; Vahalik, 2015).

Though many researchers agree to the substantial benefits of export diversification, it could also be argued that there are certain challenges which limit export diversification in least developed countries (LDC). The mentioned challenges include but not limited to bureaucracy, inadequate infrastructure, lack of finance, lack of skilled labor, entry barriers to markets and in terms of Afghanistan, being a land-locked country.

### 6.1. Recommendations

Based on the figures shown in Table 5, export diversification has negative sign denoting that Afghanistan's exports has been diversified to some extent to influence economic growth. Therefore, export diversification should be promoted in Afghanistan in order to sustain the economic growth in the country. The following are the policy suggestions to stakeholders:

- In order to diversify Afghanistan's exports, it is recommended that the government of Afghanistan should have greater emphasis on the production of higher-value-added products. This would lead Afghanistan to economic growth.
- It is proposed to the Afghan government to undertake the measures towards the identification of new export markets. This may be achieved by signing of bilateral and regional trade agreements with a number of countries, which would serve to expand trade in goods and services. Government of Afghanistan should work closely with its regional counterparts to streamline the administrative requirements in the region to increase market access to a number of countries.
- Human capital in the form of skilled labor should be considered as one of the important elements of export diversification and economic growth and the government of Afghanistan together with private sector should invest on education and training of skilled labor for high-value services.

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