The role of the coffee industry in sustainable economic development in Vietnam

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CHRONICLE	ABSTRACT
	The aim of this research is to analyze the impact of coffee industry on economic growth of Vietnam. This research has used historic data for coffee production, consumption, exports, and coffee stock for Vietnam, thus this research has followed a quantitative design. The data in this research has been collected from the time period ranging from 1990 to 2018. There are several techniques that were applied in E-views such as descriptive statistics, bounds test, and autoregressive distributed lag model. The results of ARDL model indicate that in the short run coffee industry has an influence on the economic growth in Vietnam. It can be stated that for the short-run the null hypothesis is rejected stating that domestic consumption, exportable consumption, gross opening stock, and total coffee production have impacts over the gross domestic product (GDP) of Vietnam. The results of Bounds test show there is a significant impact of coffee industry on the economic growth of Vietnam in the long run as well.

1. Introduction

Coffee is recognised as the widely traded commodities in the world which are produced by around 25 million producers in more than 14 different countries. According to the study of Gaitán-Cremaschi et al., (2018), it has been highlighted that the Vietnam is the greatest producer of coffee which has 12%-15% of the share in the world and is regarded as the largest exporter of the coffee after Brazil. In the year 2013, the coffee exports mainly accounted for the 2% of the entire GDP of Vietnam along with 17% for the commodity exports. In the Vietnam, the coffee production is regarded as the significant aspect for the growth and development of the economy and it is also said to be crucial for the Central Highlands. In addition to the above statement, the unshaded farming systems which are mainly utilised by the farmers and the producers generate harmful influences on the environment. In light of the study conducted by Reinecke, Manning and Von Hagen (2012), it has been highlighted that the coffee farming in the country mainly requires the application of the fertilisers which are quite costly for the company. Moreover, the high fertilisers are mainly related with the rates of greenhouse gas emissions that also significantly contribute towards the changes in the climate and have adverse influence on the water quality and biodiversity. Because of the expenses of the fertilisers used for the production, most of the farmers and producers are unable to produce coffee which is the ultimate challenge faced by the coffee industry of the Vietnam. In addition, the ensuring of adequate production for the plantations of the coffee requires support from the government in terms of additional investment of the construction which negatively influences the ecosystems. According to D'haeze et al., (2005), the profitability of the coffee farming is found to be in pressure which is based on the increase cost of production along with the labour and fertilisers. Also, the volatility of the coffee prices is increasing in the world market which is the reason that the revenues for the coffee production may eventually not cover the entire cost and will make the industry more profitable. However, the situation leads towards the replacement of coffee with other crops and the coffee farms were abandon that influences the livelihood of

different communities. The challenges faced by the industry in Vietnam are focused on the pillars of sustainability which is based on social, economic and environmental. According to the study conducted by Do, Kumar and Do (2019), it has been highlighted that the first step towards the achievement of the sustainable production of the coffee is entirely based on the exploration of social and economic factors which can enhance the sustainability level of the production. For overcoming the challenges, the following study has been carried out which is intended to focus on coffee industry in sustainable economic development in Vietnam. The approach which has been followed for the research paper is to initiate with the literature review, where methods is based on ARDL and bound testing approach to evaluate the impact of variables related to sustainable economic development and coffee industry.

2. Literature Review

Sustainable economic development that growth-related to an economy that efforts to satisfy the requirements of human but in a way that sustains natural resources and creates the environment for upcoming generations. Moreover, the economic processes in the ecosystem since it cannot discrete the economy from it and it is evident that the economy cannot have any importance without it (Hammer & Pivo, 2017). In light of research conducted by Vasylieva et al. (2019) that the advantages of sustainable economic growth influence more than just those in deficiency and poverty. On the contrary, the other concept of sustainable economic development is proposed by Kruja (2013) and it depicts the way economic development is disseminated amongst the population that illustrates the level of growth. The notion of sustainable development has become a broadly accepted and recognised goal for the society of human living their lives in this modern century. Therefore, it is considered as a need of the 21st century. On the contrary about the ecosystem, it has been stated by Bilan, Mishchuk & Pylypchuk (2017) that the ecosystem offers the determinants of production that energies the economic growth with the usage of labour, land, capital and natural resources that are created by natural resources and labour. There are various challenges confronted by companies while creating sustainable economic development. But the major challenges are instability for instance as a struggle between the nations. Integrations, for instance, guaranteeing programmes fit the normal contexts in which governments such as the political have to convert growth and development programmes into long-term and sustainable development procedures (Jones, Hillier & Comfort, 2017). The world is confronted with contexts in all three dimensions of sustainable development including environmental, social and economic. It has been mentioned that more than one billion people are still suffering their lives in greater poverty and inequalities related to income within and among various countries has been improving. At a similar period, untenable depletion and patterns of production have an outcome in the greater social and economic expenses and might risk the lives of people on the planet. The accomplishment of sustainable economic development will entail global activities to provide on the appropriate aspiration in direction to additional social and economic development, necessity employment and development and at the similar period it also consolidates protection (World Economic and Social Survey, 2013). On the other side, sustainable economic development will require to be comprehensive and attain special care of that requirement of the humblest and most vulnerable. Moreover, strategies require to be determined, collaborative and action-oriented and to integrate to various distinct stages of development (Vasylieva et al., 2019). There is a requirement of consumption of systematic change and patterns of production and might involve, important correction of pricing, inter alia that motivates the salvation of natural endowments, exerts economic governance and decrease inequality (Ahmed & Shimada, 2019). Coffee has created an entire industry chain in various region of Vietnam which is also a significant part of the Vietnamese economy offering millions of employment opportunities for jobs. It has been anticipated by Burns (2020) that the resulted volume of Vietnamese beans of coffee will be developing and keep on growing in both international and national demands and also help to increase the export volume. Moreover, the coffee industry of Vietnam is also tending towards the growth because of increasing trends of coffee products across the globe. Due to emerging competition of the coffee in the local and global market, there is a vitality in prices of coffee. Consequently, there is an influence of coffee price and its volatility on the coffee growers of Vietnam concerning the emerging competition. Therefore, the Vietnam coffee industry requires an increased path out to assist in the mitigation of risk and problems faced by coffee growers (Gonzalez-Perez & Gutierrez-Viana, 2012). Vietnam is one of the most influenced countries of the world by impulsive natural disasters and climate change, which will impact sustainable development growth and its procedure of implementation. Thus, the government is improvingly emphasising on the integration of climate change and green development. Moreover, the green development strategy of Vietnam with a similar green action plan will directly influence the majority of sustainable development growths. Sustainable development preserves to perform a key role in the local strategies beyond the year 2020. The reason for depicting aforementioned statement is that because Ministry of Finucane (MOF) of Vietnam is presently increasing policies concerning environmental protection charges for emissions and wastewater to encourage sustainable economic development (Baum, 2020). While majority economists and individual disagree about the significance of the environment concerning economic activity. It includes certain facts in which the depletion and extraction of natural resources. The value chain analysis is given by Samper and Quiñones-Ruiz (2017) is based on four major dimensions and related to economic growth as well. These dimensions are the institutional framework through which the activities of the value chain are processed, geographical coverage, governance structure and input-output structure. All these determinants have a relation with the sustainable economic growth of any industry of a country. In this, the input-output structure portrays the levels of production and conversely geographical dimension pacts with the special elements where different production level are processed and aimed at the sustainable economic development based on the possibility of each level.

The coffee chain has leveraged important alterations during the last few decades along with an improved significance of global consumption and greater priced coffees that is integrated on distinct procedures (Simons, 2017). Vietnam has an advantage of coffee production along with the countries like Myanmar and China and has additional consumption by greater regions like Asiatic and East Europeans are major buyers of the coffee. The given below are the challenges related to economic development confronted by coffee growers. This includes different issues related to the growers of coffee, buyers and dealers of coffee. Hence, with these specific issues, the coffee industry has a negative influence on the sustainable economic growth of any country specifically the coffee-producing countries like Vietnam (See Table 1).

Table 1
Overview of Economic Challenges Confronted by Small Coffee Growers

Economical Issues	
	Green Bean price volatility
	Exchange rate volatility
	Long term decreasing real coffee prices
	Lack of market information
	Lack of product information
	Rising living costs
	Ageing coffee trees
	Land tenure uncertainty
	Limited access to insurance and hedging instruments
	Poor services through local or farmer organization
	No living income

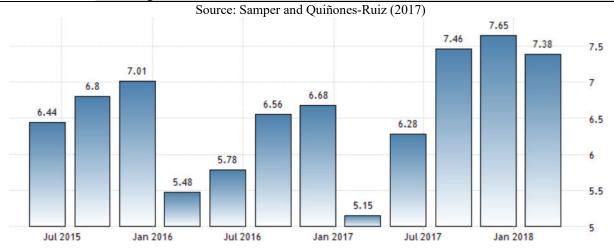Source: Samper and Quiñones-Ruiz (2017)

Fig. 1. GDP Growth Rate of Vietnam
Source: International Coffee Council Report. (2019)

The aforementioned picture denotes the changes and continuous growth in Gross Domestic Product (GDP) rate which significantly increased from 2015 to 2018 (See Table 2).

Table 2
Coffee Output of Vietnam from 2013 to 2017

	2013	2014	2015	2016	2017
Total growing area (thousand ha)	635.90	641.30	645.20	662.20	662.20
Harvested area (thousand ha)	581.30	589.70	597.30	610.00	627.00
Output (thousand tonnes)	1381	1408	1453	1458	1529
% change in output	4.5%	2.0%	3.2%	0.34%	4.87%

Source: International Coffee Council Report. (2019)

The above statistics are related to the change in the output of coffee in Vietnam which also has a meaningful increase with the time. It depends on the crop percentages which is more in the year 2017 in comparison to others. The reason for including these numbers in this paper is because this help to understand the economic development in Vietnam due to the coffee industry.

The increased output of coffee in Vietnam has a reasonable contribution to the GDP of the country which strengthens the agricultural environment through which coffee is produced that eventually support the sustainable economic development for a country (See Table 3).

Table 3
Share of Coffee output on Vietnam's GDP

	2013	2014	2015	2016	2017
National GDP (billion US$)	171.22	186.20	193.24	205.28	223.86
Agricultural GDP (billion US$)	34.21	36.64	36.50	37.23	38.31
Coffee GDP (billion US$)	4.11	3.48	4.04	4.65	4.84
Share of Agricultural/National GDP	19.98%	19.68%	18.89%	18.14%	17.63%
Share of Coffee/Agricultural GDP	12.00%	9.50%	11.60%	12.48%	12.63%
Share of Coffee/National GDP	2.40%	1.87%	2.09%	2.26%	2.16%

Source: International Coffee Council Report. (2019)

3. Theoretical Framework

There is an abundance of literature related to sustainable economic development. Amongst the various theories, the first theory selected for the critical discussion is Endogenous Growth Theory. The key takeaways of this concept are that this notion preserves that economic growth is mainly the outcome of internal forces in comparison to external ones. Conversely, it has been contended that developments in productivity can directly be tied to rapid change or innovation and additional investments in human capital from institutions of both private and government sectors (Pan & Ngo, 2016). In relation to applications of this theory with the current study is that the focus of the concept is the emphasis the innovation as the importance of economic growth. Therefore, companies working in a coffee industry has to work on the innovation, better delivery and have a factor of distinctiveness which leads to the sustainable economic development for the company which eventually a growth for the coffee industry. The other suitable theory is Neoclassical Growth Theory that is related to an economic theory that summarises how a stable rate of economic development outcomes from the assimilation of three key driving forces. These forces are technology, capital and labour in which the economy amongst which capital and labour are considered to e-scarce resources. Whereas, the technologies play a key role in the development which is also considered as boundless growth (Sredojević, Cvetanović & Bošković, 2016; Cvetanović, Mitrović & Jurakić, 2019). Similarly, this concept reflects that the coffee industry has to believe in labour and train the workforce according to the requirement of an industry that direct to the sustainable economic growth for the industry. Moreover, capital is a basic requirement for any business and its economic growth that also support to integrate the technological aspects in the internal and external operation of the business such as manufacturing process or marketing of products and services. Hence, all three factors direct the coffee industry in sustainable economic development with the greater implications of technology.

4. Methods and Materials

This research has used historic data for coffee production, consumption, exports, and coffee stock for Vietnam, thus this research has followed a quantitative design. With respect to the main aim of this research, there are two types of variables: independent and dependent. Coffee industry is the independent variable which has been measured from a number of metrics such as coffee production, coffee consumption, and exports of coffee and gross opening stock of coffee for the country Vietnam which is the main focus of the study. The independent variable of this study is economic growth which has been measured with the help of GDP expressed in dollars ($). In order to analyse the model effectively, the researcher has also included the variable of inflation as the control variable in order to better understand the relationship between coffee industry and economic growth of Vietnam. The data in this research has been collected from the time period ranging from 1990 to 2018. This particular time period is selected because the authenticity and accuracy of the results are dependent over sample size of the data thus, using 29 years data was sufficient to obtain results for evaluating the aim and objectives. To analyse the data, the researcher has chosen E-views considering it is a widely used platform for running econometrics data analysis and evaluation. There are several techniques that were applied in E-views such as descriptive statistics, bounds test, and autoregressive distributed lag model. Descriptive statistics were obtained to study the characteristics of the data, unit root tests for each variable were performed to assess whether there was presence of unit root. Considering that there was no presence of unit root, hence ARDL model was applied to analyse the impact of coffee industry on economic growth. Since ARDL model only depicts the short-term association or impact, bounds tests was carried out to determine the long-run relationship in the variables. The impact of variables has been measured on the basis of the following econometrics equation:

$$LGDP = \alpha + \beta_1 LCP + \beta_2 LDC + \beta_3 LEP + \beta_4 LGOS + \beta_6 Inf + \varepsilon$$

where:

$LGDP$ = log of Gross Domestic Product
α = Intercept
β = Slope
LCP = log of total coffee production
LDC = log of total domestic coffee consumption

LEP = log of exportable production
$LGOS$ = log of gross opening stocks of coffee
Inf = Inflation rate
ε = Error term

5. Results and Analysis

5.1 Descriptive Statistics

For summarising the data and to understand the statistical characteristics of the data, descriptive statistic has been applied. Table 4 shows the results of the descriptive statistic for the independent, dependent, and control variables included in the model:

Table 4
Descriptive Statistics

	DOMESTIC_CONSUMPTION__	EXPORTABLE_PRODUCTION__	GDP_	GROSS_OPENING_STOCKS__	INFLATION	TOTAL_COFFEE_PRODUCTION__
Mean	1016.051	14140.53	8.30E+10	1483.241	5.830163	15156.58
Median	696.356	14439.68	4.54E+10	640	4.114342	14841.31
Maximum	2700	28474.07	2.45E+11	5000	23.11545	31174.07
Minimum	150	1160.288	6.47E+09	0	-1.710337	1310.288
Std. Dev.	827.8322	8594.73	7.46E+10	1694.967	4.980286	9362.01
Skewness	0.743366	-0.008407	0.81029	0.988106	1.896386	0.061067
Kurtosis	2.075138	1.791745	2.251266	2.394577	7.377868	1.789479
Jarque-Bera	3.704442	1.764364	3.850813	5.161942	40.5406	1.788668
Probability	0.156888	0.413879	0.145817	0.0757	0	0.40888
Sum	29465.47	410075.5	2.41E+12	43014	169.0747	439541
Sum Sq. Dev.	19188574	2.07E+09	1.56E+23	80441528	694.491	2.45E+09
Observations	29	29	29	29	29	29

The value of domestic consumption, exportable consumption, gross opening stock, and total coffee production are all measured in 1000 60kg bags. The mean value for the domestic consumption shows that on an average in Vietnam from 1990-2018, 1016000 60 kg bags were consumed domestically. The mean value for exportable production shows that on an average in Vietnam from 1990-2018, 14140000 60 kg bags were produced for the purpose of exporting to other trading partners. The mean value for gross opening stocks shows that on an average in Vietnam from 1990-2018, 1483000 60 kg bags of coffee were considered as the opening stock. Lastly, on an average in Vietnam from 1990-2018, 15156000 60 kg bags were produced altogether for domestic consumption as well as for exporting it to other countries. The average GDP for Vietnam for the selected time period was $83 billion as indicated by the mean value which is deviated by $74 billion units. The average percentage of inflation during the 29-year time period was 5.8% and the value of standard deviation shows that it was deviated by 4.98%.

5.2 Unit Root Testing

This research model has considered time-series data hence unit root testing was performed in order to determine if the variable is non-stationary or not. The null hypothesis of this test is that there is a presence of unit root or the data is stationary. Rejection of the null hypothesis means that the data is non-stationary and has a trend. Table 5 shows the results of Augmented Dickey Fuller (ADF) test which was carried out to determine the presence of unit root in the variables:

Table 5
ADF Testing

Variable	t-Statistic	Prob.*
LCP	-3.96046	0.0056
LDC	-6.67289	0.0000
LEP	-5.54276	0.0001
LGDP	-5.48599	0.0001
LGOS	-5.34343	0.0003

Table 5 shows the value of t-statistic and probability value which is responsible for determining that whether the null hypothesis is rejected or retained. For all the variables included in the research model, the null hypothesis is rejected showing that the variables are non-stationary and there is a trend which can be depicted for future values.

5.3 Autoregressive Distributed Lag Model

Autoregressive Distributed Lag (ARDL) model is an Ordinary Least Squares (OLS) based model which is mostly applicable in the case of data which is non-stationary, however, it can also be used for variables with unit root. The following table shows the results of ARDL model:

Table 6
ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDP(-1)	0.662085	0.23769	2.785501	0.0177
LGDP(-2)	-0.20264	0.178038	-1.13819	0.2792
LCP	-2.52698	2.30596	-1.09585	0.2966
LDC	0.323434	0.228166	1.417539	0.184
LDC(-1)	-0.34744	0.133706	-2.59856	0.0248
LDC(-2)	0.761334	0.170587	4.463018	0.001
LEP	2.471657	2.159653	1.144469	0.2767
LGOS	0.009672	0.026535	0.364508	0.7224
LGOS(-1)	-0.00806	0.015181	-0.53056	0.6063
LGOS(-2)	-0.04933	0.021841	-2.25833	0.0452
INFLATION	0.001708	0.000801	2.132387	0.0563
C	4.174488	1.10552	3.776042	0.0031
R-squared		0.999517		
Adjusted R-squared		0.999035		
F-statistic		2070.773		
Prob(F-statistic)		0.0000		

The first section of the table indicates the lags of variables and their respective p-value. If the p-value of the variables are within the acceptable range i.e. less than 5% it shows that trend can be predicted with the help of lags. The first lag of GDP has a significant probability value which indicate that its value can be predicted from the historic values. Also, domestic consumption can be predicted based on first and second lag as the sig value is 0.02 and 0.001 respectively. Moreover, it is also evident that the future values of gross opening stock of coffee can be predicted based on the second lag. The second section of Table 3 indicates important values that should be interpreted to evaluate the overall model. The R-squared value depicts the ability of predictors in defining the variance caused in the criterion variable. The R-squared value is 0.999 which translates to domestic consumption, exportable consumption, gross opening stock, and total coffee production having the collective ability to explain 99.9% changes that occurred in the economic growth of Vietnam. The value of adjusted R-square indicates similar results which shows that predictors are effective in explaining the changes in dependent variable. Lastly, the overall model is deemed to be significant because the probability value is 0.000 which is less than 0.05 or 5% at 95% significance level. Thus, the results of ARDL model indicate that in the short run coffee industry has an influence on the economic growth in Vietnam. It can be stated that for the short-run the null hypothesis is rejected stating that domestic consumption, exportable consumption, gross opening stock, and total coffee production have impact over the GDP of Vietnam.

5.4 Bounds Test

From the above analysis it has been found that there is a presence of impact of coffee industry on the economic growth of Vietnam in the short run, in order to determine the significance of this impact in the long-run, Bounds test are performed. The following table shows the output of this test:

Table 7
Bounds test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	14.85765	10%	2.08	3
k	5	5%	2.39	3.38
		2.50%	2.7	3.73
		1%	3.06	4.15

The value of F-statistic is greater than the integration order values of level 0 and 1 which shows that the relationship is significant. Thus, the null hypothesis for the Bounds test in the given model is rejected stating that there is a significant impact of coffee industry on the economic growth of Vietnam in the long run.

6. Discussion

The present study is focused towards assessing the role of the coffee industry within the sustainable economic development in Vietnam. Based on the findings of the study, it was identified that the social sustainability for the coffee industry has entailed a moderate approach and it is believed that this practical approach is mainly justified for the specific problem. However, the sustainability assumption should be evaluated carefully and such approach should be used in the production environments or the

output is considered (Hung Anh & Bokelmann, 2019; Barnes & Dai Chu, 2019). In addition to the above statement, the groundwater and the deforestation depletion are the significant aspects for the sustainability of the coffee farming within the Vietnam. Furthermore, the findings further revealed that the coffee farms are regarded as the economic concern in which the cost for the groundwater irrigation mainly increases because the groundwater level decreases. However, the findings further reveal that it is the environmental concern where the groundwater depletion takes place. Furthermore, the application for the yield of the coffee along with the fertiliser is dependent on the volume for the irrigation along with the timing. Since in the present study, the researcher has used ARDL testing, therefore, the analysis revealed that that in the short run coffee industry has an influence on the economic growth in Vietnam. The findings further highlighted that within the short run the hypothesis was reject based on the domestic consumption, and total coffee production has a significant influence on the GDP of the country. The findings further revealed that the research cannot be associated with the extrapolation for the entire coffee in the Vietnam as there are certain outcomes pertaining to the researchers and policy makers that identify the opportunities where the sustainability performance for the coffee farms in the country can be improvised.

7. Limitations

This research paper has taken into consideration all the important elements with respect to the aim and objectives of the study however, there are certain limitations with respect to the model, sample size, data collection and analysis which are to be acknowledged. Firstly, this research is restricted with respect to the scope of Vietnam's coffee industry. As per the unique social, economic, political, and cultural factors of each country, the results of this research cannot be inevitably pertinent on other countries. Moreover, this research has taken into account data from 1990 to 2018 which is 29 years, more data could have added to the authentication and accuracy of the results. This research paper has considered four predicting factors in order to measure the variable of coffee industry: domestic consumption, exportable consumption, gross opening stock, and total coffee production, future researches can take into account other factors such as retail price of coffee. In the light of the above mentioned limitations, future researches can be carried out in a manner that they contribute towards the existing literature.

8. Future Implications

There are several recommendations for the future researcher who want to conduct research on this topic. Firstly, the researcher can take into consideration multiple countries in order to make comparison between the significance of coffee industry with the economic growth and productivity. Other than the determinants that are used in this research, future researchers can take other variables such as retail price and coffee inventories to add value to the existing literature. This research paper has only relied on quantitative historical data, future researches can also incorporate qualitative data in the form of interviews with coffee experts and economic analysts in order to obtain detailed and comprehensive responses regarding coffee industry, its dynamics, and influence on the economic growth.

9. Conclusion

This study is based on the evaluation of the coffee industry practices for the sustainable economic development in Vietnam. The study has used the ARDL technique for the estimation of the relationship between coffee industry and the economic growth in the Vietnam. It has been asserted that Vietnam is the second largest producer of the coffee; however, the industry is facing issues pertaining to the high cost of production and technology used for the fertilisers. For investigating the issues, the research has taken into consideration historic data for coffee production, consumption, exports, and coffee stock for Vietnam; hence this research has followed a quantitative design. There are several techniques that were applied in E-views such as descriptive statistics, bounds test, and autoregressive distributed lag model. The results of Bounds test display that there is a significant impact of coffee industry on the economic growth of Vietnam in the long run as well.

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