



**Research Article**

**ANALYZING THE SHARE OF AGRICULTURE AND INDUSTRIAL SECTORS IN THE ECONOMIC GROWTH OF ETHIOPIA: AN ORDINARY LEAST SQUARES (OLS) APPLICATION**

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**ABSTRACT**

Ethiopia has great resource potential that may not be available in other countries. It has a great potential of various resources that date back to thousands of years. Ethiopia is one of the areas that have diversity in terms of natural resources and industrial components. This helped increasing the gross domestic product (GDP). Hence, the purpose of this study examines and analyze factors (Agriculture and Industrial Sectors) that affecting economic growth of Ethiopia. Research on agriculture and industrial in Ethiopia reveals strategies and solutions to overcome the obstacles confronting the Ethiopia economy by diversifying the economy. To achieve study objective the Ordinary Least Squares (OLS), multiple regressions \_ Double log with economic analysis were applied in the study and the secondary data from 1980 to 2016 was used to estimate the contribution level of economic sectors to economic growth. The empirical result shows that political and security instability had negative effects on the agriculture and industrial sectors as well as on the economic growth. This study also found that both agriculture and industrial sectors had positively effected on gross domestic product (GDP). Nevertheless, the effect of industrial sector was smaller, if compared to agriculture sector. Ethiopian government should give opportunities to extensively develop Agriculture and Industrial sectors and in the process help to increase gross domestic product (GDP). Furthermore, government should consider agriculture and industrial diversification as necessary strategies to develop Ethiopia's economy. This study contributes to the body of knowledge because this study attempts to present a clear picture of the agriculture and industrial sector of Ethiopia. The study also identifies the problems that facing the Ethiopian economy and selects the necessary policy to solve the problems.

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**INTRODUCTION**

There are many different ways for developing and economic growth in a country. It is well documented that agriculture and industrial sectors have significant role in accelerating economic growth of a country, however, sharing of such sectors are different according to the countries. At the first stage of economic development agriculture and industrial sectors are affective elements for an economy, because such sectors can provide more job opportunities, security in producing sufficient food, and then poverty reduction (Michael & Stephen, 2001). Thus, both sectors are backbone of the country's economy, for the reason that countries cannot exist without agriculture development, and cannot develop without industrialization. The agriculture and industrial sector are two of sectors with great impact on the economic growth in the countries.

Both sectors are vital for economic development, for example, in increasing GDP and decreasing employment. India is one of the countries which continuously its development depends on agriculture and industrial sectors. Therefore,

agriculture and industrial sectors have a positive impact on increasing GDP in India (Sahoo & Sethi, 2012). In Pakistan, GDP has increased when the agriculture improved, it means that, the relation between agriculture and GDP are significantly positive (Anwar, Farooq & Qureshi, 2015). Another study supported that the agriculture and industrial sectors have more fundamental impact on Pakistan economy and GDP growth (Nazish, Iqbal & Ramzan, 2013).

Even though investments in both sectors are beneficial for countries, the allocation of risk and returns has fundamental role in the business decisions process concerning the level of vertical combination. In the past few decades, agricultural value chains have likely focused on returns in processing and allocation, whereas the risks drop primarily on dominant manufacturing (Vermeulen & Cotula, 2010). Additionally, the distribution of risks and returns are changed because of alternation in agriculture commodity prices, by enhancing the downstream risks to processors and distributors, concerned about the provision securities, and improving returns from production (Noland & Pack, 2005). Advocates of agriculture-led growth (ALG)

contend that investment in agriculture and the accompanying creation of infrastructure and institutions in other sectors is a prerequisite for national economic growth (Schultz, 1988; Stringer & Pingali, 2004).

The fundamental role that agriculture plays in development has long been recognized. In the seminal work on the subject, agriculture was seen as a source of contributions that helped induce industrial growth and a structural transformation of the economy. However, globalization, integrated value chains, rapid technological and institutional innovations, and environmental constraints have deeply changed the context for agriculture's role. Governments and donors have neglected these functions of agriculture with the result that agriculture growth has been reduced, 75% of world poverty is rural, sectoral income disparities have exploded, food insecurity has returned, and environmental degradation is widespread, compromising sustainability (Byerlee *et al.*, 2009).

The principle aim of this article is to identify Sharing the Agriculture and Industrial Sectors in the Economic Growth of Ethiopia, and determine challenges faced by both sectors. The structure of this research is divided by some sections. In first Section introduction is focused; and theoretical framework of the study followed by. Also, next section in this research summarizes the related literature. Data description and methodology models with the results are clarified in Section 4. The end of this study provides the conclusion.

### **Theoretical Framework**

#### **The Concept of Agriculture**

Agriculture is considered to be a vital determinant of a country's economic strength and development. In addition, it is a type of activity which involves land, labor, capital and organizer to produce plants, animals, and forest resources for consumption and providing the agrarian products which is demanded by other fields (Lawrence & Salako, 2015). Accordingly, "Beyond its primary function of producing food, agricultural activity can also shape the landscape, provide environmental benefits such as land conservation, the sustainable management of renewable natural resources and the preservation of biodiversity, and contribute to the socio-economic viability of many rural areas" (Ahluwalia, 1996).

From a policy perspective the role of agriculture has been significant for some reasons: promoting economic evolution and growth, the transient from an agro-economic to manufactured or modern economy would rely on how important the field of agriculture enables such a change (Behera & Tiwari, 2014). For instance, Pani (1984) implies that one per cent rise in agriculture production raises the net domestic product (NDP) by approximately 0.56 per cent.

It is well documented that agriculture sector has crucial role in employing huge numbers of workforces than other sectors (industries and services), especially in where labor productivity is not high. Agriculture in developing economies employ more than (60-70%) of the workforce, this includes India and until the 1990s China, while in developed countries less than (10%) of workers are in agriculture (Perkins *et al.*, 2008). Until the Industrial Revolution the majority of the population depended in agriculture for their survival (Sahoo & Sethi, 2012).

#### **The Concept of Industry**

Industry is the manufacture of goods and service in well organized plants with high degree of specialization and automation. It can likewise include other commercial activities that supply goods and services like transportation and hospitality (Verspagen, 2000). In addition, such a sector refers to mining, manufacturing, construction, gas, water and electricity (Sahoo & Sethi, 2012). The role of Industrialization sector is remarkably important for economic growth, and for poverty reduction. However, the pattern of industrialization, effects on how economy of countries advantage from growth (Sahoo & Sethi, 2012). Thus, expanding industrial field is remarkably significant for economic development (Kniivilä, 2004). Starting with the industrial revolution, technological adjustment has played crucial role in industrial sector (Sahoo & Sethi 2012). In the early 1990s, the value of world's industrial sector rises; for example, over (60%) of such a rise can be attributed to six major industrial countries - the US, Japan, Germany, Italy, the UK and France. While developing nations included 21% of manufacturing vale rise. This shows that there is an obvious gap between developed and developing nations, as analyzed by (Kniivilä, 2004).

#### **The Contribution of Agriculture and Industry Sectors in Economic Growth**

Based on above discussion, agriculture and industrial sectors are regarded as important elements specifically in the initial stages of economic growth of a country. Such sectors play vital role in the balanced economic development of an economy (Michael & Stephen, 2001). It is well documented that both zones have essential role in accelerating GDP growth and holding the key of overall economic development by generating employment and revenue, insuring self-reliance in food production and security, supplying tools to other fields and foreign exchange earnings, (Lawrence & Salako, 2015).

According to (Karshenas, 1996) there is an interdependency between the sectors of traditional agricultural and modern industrial to a nations overall economic growth. Growth in agriculture relies on the industrial demand for agricultural products. Correspondingly, industrial growth relies on a rise in purchasing power of the agricultural field for manufactured products and on the providing of raw materials for processing. Many emerging nations have realized the significance of the agricultural field and its role in industrialization for their economic development, (Rangarajan, 1982).

More specifically, agriculture is essential source of resource for countries that want to industrialize, which could be used for investment in the emerging activities. Accordingly, outstanding industrialization demands a solution to the problems connected with the creation, transition, and the surplus of agrarian resource. Generation of an increasing surplus requires an increasing output of farming resources (Souza & Paulo, 2014).

Growth of industrial sector in developed world generated a rise in demand for primary goods from developing countries. Technological improvements in communication, transportation, and infrastructure developed the trade opportunities. However, emerging nations still continued to

fundamentally rely on agrarian or mining. Significant components of manufacturing have moved to developing world which provide industrial exports to the wealthy nations (Naudé & Szirmai, 2012). Expansion of exports can promote economic growth both directly as a part of aggregate output, likewise indirectly through efficiency in resource allocation, bigger capacity, exploitation of economic scales, stimulating technological progress owing to competition of overseas market (Awokuse, 2009). Moreover, production of manufactured goods for exports stimulates efficiency throughout the economy. This is important when the output of an industry is used as an input of another domestic industry (Mahdavi and Fatemi, 2007)

Although several studies have outlined the potential contribution of agriculture and industry sectors to economic development. Their role is been a subject of controversy among development economists. For example, some argued that agricultural evolution is a prerequisite to industrialization; others firmly disagree for a distinct path. Nevertheless, few believe that sharing these sectors in economic growth is more beneficial; particularly for coffee-exporter nations.

In favor of agriculture role, several authors contend that growth in the entire economy relies on the evolution of the agriculture field (Schultz, 1988; Gollin, Parente, & Rogerson, 2002). These analysts outline that growth in agrarian sector can be a catalyst for growth of domestic output via its impact on rural incomes and supplying of resources for transformation into manufactured economy (Delgado, 1995 ; Schneider & Gugerty, 2011). According to the finding of Awokuse (2009) agriculture indirectly affects on aggregate economic growth, which can provide better caloric nutrient for the poor, stability in the price of food, job opportunity particularly in low-income nations, improvement in the quality of production factors namely (capital and labor), and poverty reduction. Additionally, previous growth theories acknowledged the agriculture field as a magnificent source of resources to finance the industrial sector's development (Johnston & Mellor, 1961; Schultz, 1988).

In contrast to the above arguments, supporters of opposite perspective argue that there is not strong connection between sector of agriculture and other fields. In such a sector, sufficient innovative structure is essentially required to promote higher productivity and export evolution (Stringer & Pingali, 2004). In addition, in many emerging countries, the sector of agriculture was subject to abundant taxation. For instance, beyond the reform of agriculture in 1979 Chinese agriculture was under large taxation and the incomes were adopted to help development of industrial sector (Yao, 2000). Despite, in theoretical analysis, Jinding & Koo (1990) investigated sharing industry sectors in promoting economic growth, and emphasized those countries where export industrial products can generate higher level of GDP growth to support more income and tax, which are significant to fund initiation of life quality such as health care and infrastructure in the economy.

#### ***Agriculture and Industry: Theory of Investment***

Investment theory is a body of knowledge that can be used to support "the decision making process" for choosing appropriate way of investing, among various investment

options. It encompasses the capital asset pricing model, efficient market hypothesis, portfolio theory, arbitrage pricing theory, and rational pricing (Eklund, 2013).

In order to decide whether an investment is to be initiated or not, with the consideration of high degree of profit, there are a number of different decision rules. Such rules commonly consider the future expected cash flow caused by investment, investment cost and capital cost of the company (Love & Zicchino, 2006). Further, Scheibl & Wood (2004) conclude that there are four investment objectives, such as: rise in market share, increase the output of existing capacity, modernize; minimize shareholdings. In addition, Richardson (1960) imposes that the profitability of an investment business relies on other firms' investment behavior. Alfredo & Vicente, (2010) defined investment behavior as how investors work, expect, examine and review the decision making processes, which incorporates the psychology of investment, accumulation of information, comprehending and defining, research and examination. In respect of evaluating an investment opportunity is profitable Richardson (1960) also emphasizes that, it is remarkably important to know whether firms have adequate information. He contended that a necessary demand for constant reaction to the opportunities of profit is for 'imperfections or frictions' and 'market connections' which 'clog the competitive system' to continue. Frictions enforce a restraint on the length to which competitor reacts could react and differ the reaction times of various firms. Friction presences supply firms with adequate knowledge of the entire supply reaction, so that contributing to the resolving the coordination problem.

In addition, comprehensive bodies of literature have examined investment behavior of the sectors of industrial and agriculture. For instance, regarding the investment behavior, Scheibl & Wood (2004) adopted the combination of quantitative and qualitative data to exam British brick industries to promote a grounded investment theory. They outline that the high capital cost which associated with overinvestment ought to supply the circumstances that weather stimulate firms to prevent surplus capacity or create pre-emption especially effective. Therefore, in order to the industry significantly profit, the brick firms' capacity decisions are made, by the combinations of these features. The fundamental deterrent of a brick firm's capacity is the 'size and number of its kilns'. Therefore, the size of kiln and plant has dramatically grown.

While in high income nations, Investment in industrial sectors is high; investment in agriculture is recently getting bigger in low and mid income nations (Vermeulen & Cotula, 2010). This is because of some structural aspects, for instance; Population development, rise in urbanization rate (which explore the contribution of the world's population that relies on buying food) and diet changes (such as increasing demand for fast food and meat in large industrial nations), and therefore, this leads to increasing demand for food (Godfray *et al.* 2010). Additionally, agriculture increasingly becomes attractive investment option, when demand for agriculture commodities and energy increases worldwide, meanwhile; when technological and industrial capacity for higher products and returns increase (Kniivilä, 2004).

**Agriculture and Industry: Theory of Growth**

Economic growth is an increase in the production and consumption of goods and services. It entails increasing population and/or per capita consumption. Growth rates vary enormously across countries over long periods of time. The Gross Domestic Product (GDP) is considered as essential measure of economic growth which indicates the economic performance (Ayres & Warr, 2005). An increase in real GDP means rise in the value of national output and expenditure (Bjork, 1999). In addition, GDP is defined as "an aggregate measure of production equal to the sum of the gross values added of all resident, institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)" by (Zanoli *et al*, 2007).

The extensive body of literature examines the economic growth. In order an economy grow several factors are required, for instance; energy sources, natural capital, including water timber, soil and energy sources (Bjork, 1999). Economic development is a significant macroeconomic tool because of enabling high standard of living and supplying more job opportunities; this encompasses rise in aggregate demand ( $AD=C+I+G+X-M$ ), and rising aggregate supply which means growth in capital, investment, higher labor productivity (Acemoglu, 2009).

Industrial development has had an influential role in the growth of economy. Some countries have managed to obtain growth with equity, while in others inequality has stayed high (Noland & Pack, 2005). Syrquin (1986) examines that, when overall growth accelerates, manufactured sectors commonly leads the way and grows faster than other fields. However, in low income nations the role of manufacturing in GDP is not high, and its immediate attribution to aggregate growth is small.

According to the finding of (Ricardo), who investigate the linkage between agriculture and industrial sectors and their sharing in promoting economic growth, while such a field is subject to declining returns, labor productivity declines the demand for agriculture workforce, differently; employment opportunities in manufactured sector develop (labor surplus in agriculture would turn on to industrial sector) without causing an increase in wages role (Michael & Stephen, 2001). Consequently, production in industry takes over a larger contribution of GDP than agriculture and employment in industry becomes predominant. Ranis & Fei (1961) also examined the relation of both sector in the process of economic growth; they assumed that the agriculture and industrial sectors rely on each other. Industries prefer to employing people who have prior knowledge of working in factories instead of inexperienced farmers (Stringer & Pingali, 2004). Accordingly, Awokuse, (2009) implies that without growth in agriculture, no country can exist and without industrialization countries can not develop.

**METHODOLOGY, VARIABLES AND DATA DESCRIPTION**

The econometric model identifies functional relationships between economic growth and its determinants using Ordinary Least Square Model. The OLS approach to multiple linear regressions was introduced by Gauss in 1794. The OLS technique is the simplest type of estimation procedure used in

statistical analyses (Burke, 2010). OLS is performed in economics (econometrics), political science, and electrical engineering (control theory and signal processing), among many areas of application. The OLS model includes dependent, independent variables. Additionally, each of these variables must be estimated; therefore, the accuracy of the estimation depends on the reality and precision of each data sample (Witt & Witt, 1995). However, to benefit from the refined properties of an OLS estimate, numerous assumptions must be satisfied. OLS computational techniques are commonly used to test hypotheses on differences among factor-level means in repeated measures data and are available in various commercial statistical software packages, generally under the rubric of general linear model.

Explaining the growth rate of output over time is usually referred to as growth accounting approach, which attempts to quantify the contribution of different determinants (e.g. Agriculture, Industrial and Service sector) of economic growth. GDP is one of the most commonly-used macroeconomic indicators for measuring economic growth (Slocum, 2006; Chen & Chiou-Wei, 2009).

There are several different frameworks in which the linear regression model can be cast in order to make the OLS technique applicable. Each of these settings produces the same formulas and same results. The only difference is the interpretation and the assumptions which have to be imposed in order for the method to give meaningful results. The choice of the applicable framework depends mostly on the nature of data in hand, and on the inference task which has to be performed (Lim, 1997; Abdullah *et al*, 2010 ; Ishikawa and Fukushige, 2007; Hutcheson, 2011). In fact, several factors influence economic growth; each of them includes several items and has different measures and different units of measurement. Hence, GDP growth for industry and agriculture sectors by ordinary least squares (OLS) methods which can be written as below:

$$EG = F (Ag_t, In_t, Z_t) \dots\dots\dots (1)$$

Where: EG = Economic growth presented by real GDP in Ethiopia during the time period t; Ag = Contribution (Add-Value) of the Agricultural sector in Ethiopia during the time period t; In = Contribution (Add-Value) of the Industrial sector in Ethiopia during the time period t;  $Z_t$  = Vector of other factors that affect Economic growth.

The above model is determined to measure the sharing of both agriculture and industry of gross domestic product. In sum, in this study the following steps are performed to estimate the economic growth models for Ethiopia for time period 1980 to 2016:

- First:** Stationary test with OLS approach.
- Second:** Using OLS approach to estimate Economic Growth Model.
- Third:** Diagnostic Checking and Accurate Estimation of OLS model.

**RESULT AND DISCUSSIONS**

***Stationary Test with OLS Approach***

Stationarity is an assumption about variables in the classical regression model. The typical regression model assumes that

variance of time series should tend to converge at a fixed finite constant in large samples. The stationary test results are reported in the tables below:

**Table 1** Result of Unit root test (Augmented Dickey-Fuller test statistic (ADF) at Level)

Variables	Intercept	Prob.*	Intercept with trend	Prob.*
Ln GDP (Growth)	1.892	0.584	1.874	0.358
Ln AG (Agriculture)	1.874	0.698	2.985	0.531
Ln IN (Industrial)	0.897	0.753	3.8745	0.235

**Table 2** Result of Unit root test (Augmented Dickey-Fuller test statistic (ADF) at First Difference)

Variables	Intercept	Prob.*	Intercept with trend	Prob.*
Ln GDP (Growth)	3.564*	0.001	3.584*	0.000
Ln AG (Agriculture)	3.254*	0.001	5.365*	0.002
Ln IN (Industrial)	5.245*	0.003	7.235*	0.001

Note: (\*), (\*\*), (\*\*\*) denotes Significant at 1% and 5% respectively.  
 Note: Number of observations is 37.

Data Source: World Bank, Ethiopian Commercial Bank (2016).

From table (1 & 2), all variables (GDP, AG, IN) are stationary in the first difference (Intercept and intercept with trend) at the 1% and 5% significance level. The OLS estimation procedure is performed after validating the relevance in the first order I (I) of the co-integration concept.

Using OLS Approach to Estimate Economic Growth Model OLS regression is particularly powerful because it allows relative ease in checking the model assumption, such as linearity, constant variance, and the effect of outliers using simple graphical methods. Moreover, OLS regression is one of the major techniques used to analyze data. It serves as the basis of many other techniques. (Lim, 1997; Abdullah *et al*, 2010; Ishikawa and Fukushige, 2007; Hutcheson, 2011). Many types of samples have been used (e.g., OLS) to estimate the elasticity of variables that explain Economic growth. Different levels of aggregation are used to investigate the agriculture and industrial of economic growth.

This section applies the macroeconomic view to relate GDP as a measure of economic growth. The purpose of this section is to estimate the contribution of Agriculture and Industrial sectors to the economic growth in Ethiopia. Thus, based on Equation (1), can investigate study objectives, which is to identify Sharing the agriculture and industrial Sectors in the economic growth in Ethiopia by applying data from 1980 to 2014. The results of the OLS estimation are reported in Table 3

**Table 3** estimates for economic growth of Ethiopia by applying Ordinary Least Squares Estimation

Regressors	Coefficient	p.value	t-test	Standard Error	Decision
Constant	0.025	0.552	0.078	0.330	-
Gross Domestic Product (GDP)	1.540	0.002	7.530	0.163	Accept $H_0$
Agriculture Sector (AG)	0.775	0.003	3.533	0.233	Accept $H_1$
Industrial Sector (IN)	0.352	0.002	3.522	0.120	Accept $H_1$

(\*), (\*\*), (\*\*\*) denotes Significance at 1%, 5% and 10% respectively

Table 3 shows that a one percent increase in agriculture (value add) increases the Ethiopian GDP by (0.775%), and a one percent increase in industrial (value add) increases the GDP of Ethiopia by (0.35%)\*. These results also demonstrate that the GDP contribution of Agriculture Sector is much greater than that of Industrial Sector, and consistent with our expectation.

Diagnostic Checking and Accurate Estimation of OLS model After estimating the economic growth model, the diagnostic checking is conducted using (E-views 8.0). The purpose of diagnostic checking is to check the adequacy of the estimation. In current study, diagnostic test is applied to ensure the appropriateness of the OLS estimation based on both theory and statistics tools; this study used several diagnostic tests, including the tests for serial correction, heteroscedasticity, normality and function form. The F statistics and critical values are reported in Table 4.

**Table 4** Diagnostic Checking and accurate estimation of OLS model

Test statistics:	Diagnostic Test		Decision
	LM version	F version	
Serial Correlation / LM test	CHSQ(1) = 6.003 [0.014]	F(1, 3) = 0.948 [0.402]	Accept $H_0$
Heteroscedasticity /ARCH test	CHSQ(1) = 0.108 [0.743]	F(1, 23) = 0.099 [0.755]	Accept $H_0$
Functional Form /Ramsey test	CHSQ(1) = 9.432 [0.002]	F(1, 3) = 1.818 [0.270]	Accept $H_0$
Normality /Jarque-Bera	CHSQ(2) = 2.212 [0.331]	Not applicable	Accept $H_0$
<b>D.W-statistic test</b>	<b>1.478</b>	<b>1.478</b>	Accept $H_0$
<b>R-Squared</b>	<b>0.98</b>	<b>S.E</b>	<b>0.08</b>
<b>R-Bar-Squared</b>	<b>093</b>	<b>F(20, 4)</b>	<b>16.369[0.007]</b>

Notes: t-value in the parentheses (...) and p-value for diagnostic test in parentheses (\*), (\*\*), (\*\*\*) denotes Significant at 1%, 5% and 10% respectively.

Table 4 show that the Lagrange multiplier (LM) and the F-statistic are less than the critical value. The null hypothesis ( $H_0$ ; the econometrics model does not exist) is accepted across economic growth model. As shown in Table 4, there is no evidence of autocorrelation presented in this table. The ARCH tests suggest that the errors are homoscedastic and independent of the regressors. The model passes the normality tests. Therefore, the OLS model is correctly specified. Furthermore, table 4 also shows the value of S.E regression given its minimal value, is small. The  $R^2$  show that OLS model is the appropriate. Overall, OLS models produced results that were statistically accurate, consistent with economic theory, and compatible with our data and objectives.

**SUMMARY AND CONCLUSION**

Based on theoretical hypothesis and empirical investigation, this study provides comprehensive evidence of the Contribution of Agriculture and Industrial Sectors in the economic growth of Ethiopia. The methodological examination incorporated secondary data for the period 1980 to 2016. In addition, the empirical approach was based on some econometric models: Ordinary Least Squares (OLS), multiple regressions \_ Double log with economic analysis were applied in the study.

The empirical investigation of Stationary test with OLS approach provides evidence of stationary in the first

difference (Intercept and intercept with trend) for all variables (GDP, AG, IN) at the 1% and 5% significance level. The results of the OLS estimation shows that both sectors significantly impact on economic growth of Ethiopia, but the impact of agriculture is more effective, for instance, as it is founded one percent rise in agriculture sector, will increase GDP by (77.5%).

In summary, the empirical results indicate that the GDP growth of Ethiopia is influenced by Agriculture and Industrial fields; however, the impact of former is more significant. Likewise, the finding indicates that political instability had negatively effects on the agriculture and industrial sectors as well as on the economic growth. In order to progress in its economy, Ethiopian government should give opportunities to extensively develop agriculture and industrial sectors, because such sectors can help in increasing gross domestic product (GDP) and diversify Iraqi economy.

The main limitation of this study and makes suggestion for future research, study focused on the share and contribution of the agriculture and industrial sectors in the economic growth of Ethiopia. Therefore, for future research in this subject, it would be appropriate and interesting to expand the study by including more variables. Moreover, current study applied the OLS and time period from 1980-2016. Consequently, a future study can formulate and apply different techniques and can also use a different time period to compare and evaluate.

## References

- Abdullah, H., Ali, J., & Matahir, H. (2010). Re-Examining the Demand for Money in Asean-5 Countries. *Asian Social Science*, 6(7): 146.
- Acemoglu, D. (2009), "The Solow Growth Model". Introduction to Modern Economic Growth, Princeton: Princeton University Press: 26–76.
- Ahluwalia, M.S. (1996). "New Economic Policy and Agriculture: Some Reflections", *Indian Journal of Agricultural Economics*, 51 (3): 412- 426.
- Alfredo, M., and Vicente, S., (2010). Investment and Intangibles: Evidence from Banks. Working paper, Banco de España Eurosistema, Universidad De Zaragoza: 1-37.
- Aliyu, S. U. R. (2009). Impact of oil price shock and exchange rate volatility on economic growth in Nigeria: An empirical investigation.
- Alquist, R., and Kilian, L., (2008). "What Do We Learn from the Price of Crude Oil Futures?", *Journal of Applied Economics*, 25: 539–573.
- Anwar, Muhammad Masood, FAROOQ, Saba and QURESHI, Yahya (2015). Agriculture sector performance: An analysis through the role of agriculture Sector share in GDP.
- Awokuse, T.O., (2009). Does Agriculture Really Matter for Economic Growth in Developing Countries?, Working paper: 1-27. Department of Food & Resource Economics, University of Delaware. Ayres, R. U., and Warr, B., (2005). "Accounting for Growth: the role of physical work", *Structural Change and Economic Dynamics*, Elsevier, 16: 181–209.
- Bahata, Y.T., Willemse, B.J. & Grove, B. (2014). The role of agriculture in welfare, income distribution and economic development of the Free State Province of South Africa: A CGE approach, *Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa*,53(1): 46-74.
- Bamisaye, O. A., and Obiyan, A. S., (2006). Policy analysis of oil sector in Nigeria. *European Journal of Social Sciences*. (Online) Available from: <http://eurojournals.com/ejss%203%201.pdf#page=43>.
- Behera, D. K., and Tiwari, M., (2014). "Growth and Determinants of Employment in Indian Agriculture", *Journal of Land and Rural Studies*, 2(1) 43–55.
- Bjork, G. J., (1999). *The Way It Worked and Why It Won't: Structural Change and the Slowdown of U.S. Economic Growth*. Westport, CT; London: Praeger. 2-67.
- Brase, B. and LaDue, E., (1989), *Farmer Investment: A Review of the Literature*. Working Paper A.E.Res. 89.5, Department of Agriculture Economics, Cornell University.
- Burke, O., (2010). More notes for Least Squares. Department of Statistics, 1 South Parks Road, Oxford University.
- Byerlee, D., De Janvry, A., & Sadoulet, E., (2009). Agriculture for development: Toward a new paradigm. *Annu. Rev. Resour. Econ.*, 1(1): 15-31. Central Organization for Statistics and Information Technology, Iraq CBI. [www.cbi.iq](http://www.cbi.iq).
- Chen, C. F., & Chiou-Wei, S. Z., (2009). Tourism expansion, tourism uncertainty and economic growth: New evidence from Taiwan and Korea. *Tourism Management*, 30(6): 812-818.
- De Janvry, A., & Sadoulet, E., (2009). Agricultural growth and poverty reduction: Additional evidence. *The World Bank Research Observer*, lkp015.
- Delgado, Ch. L., (1995). "Africa's Changing Agricultural Development Strategies: Past and Present Paradigms as a Guide to the Future". Food, Agriculture and the Environment Discussion Paper 3. International Food Policy Research Institute, 2020 Vision. pp 1-23.
- Difiglio, C., (2014). "Oil, economic growth and strategic petroleum stocks", *Energy Strategy Reviews*, 5: 48-58.
- Eklund, J.E., (2013). Theories of Investment: A Theoretical Review with Empirical Applications, working paper from Swedish Entrepreneurship Forum: 1-20.
- Fayyad, A. and Daly, D., (2011). "The impact of oil price shocks on stock market returns: Comparing GCC countries with the UK and USA", *Emerging Markets Review*, 12: 61–78.
- Godfray, H., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence., Muir., Pretty, J., Robinson, S., Thomas, S., Toulmin, C., (2010). Food security: the challenge of feeding 9 billion people. *Science Express*, Vol. 327. Available [Online] from: [www.sciencemag.org](http://www.sciencemag.org).
- Gollin, D., Parente, S.L., Rogerson, R., (2002). "The role of agriculture in development", *American Economic Review*, 92(2): 160-164.
- Hamilton, J.D., (2003). "What is an oil shock?" *Econometrics*, 113: 363-398.
- Hutcheson, G. D.,(2011). Ordinary Least-Squares Regression. In L. Moutinho and G. D. Hutcheson, *The*

- SAGE Dictionary of Quantitative Management Research: 224-228.
- Ishikawa, N., & Fukushige, M., (2007). "Impacts of tourism and fiscal expenditure to remote islands: the case of the Amami islands in Japan", *Applied Economics Letters*, 14(9): 661-666.
- Jiménez-Rodríguez, R., & Sánchez, M., (2005). "Oil price shocks and real GDP growth: empirical evidence for some OECD countries", *Applied economics*, 37(2): 201-228.
- Jinding, L. and Koo, W., (1990). "Economic Development in the Agricultural and Industrial Sectors in the People's Republic of China." Ag. Econ. Rpt. No. 263, Dept. of Ag. Econ., North Dakota State University, Fargo.
- Johnston, B., Mellor, J., (1961). "The role of agriculture in economic development", *American Economic Review*, 51(4): 566-593.
- Jorgenson, D. W., and Stephenson, J.A., (1967b). "Investment Behaviour in U.S. Manufacturing 1947 – 1960", *Econometrica*, 35.
- Koo, W., & Lou, J., (1997). The relationship between the agricultural and industrial sectors in Chinese economic development. Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University.
- Lawrence, A., and Salako, M. A., (2015). "Agriculture, Economic Growth and Development Nexus: VAR Variance Decomposition Evidence from Nigeria", *International Journal of Economics, Commerce and Management*, 3 (6): 460-478.
- Lim, C., (1997). Review of international tourism demand models. *Annals of Tourism Research*, 24(4): 835-849.
- Richardson, G.B., (1960). Information and Investment: A Study in the Working of the Competitive Economy, Oxford, and Clarendon Press.
- Sahoo, K., and Sethi, N., (2012). "Investigating the Impact of Agriculture and Industrial Sector on Economic Growth of India". *OIDA International Journal of Sustainable Development*, 05(05): 11-22.
- Sand, R., (2002). The Propensity to Consume Income from Different Sources and Implications for Saving: Nord Trondelag research institute, Working paper: 1-12.
- Scheibl, F., and Wood, A., (2004). Investment Sequencing in the Brick Industry: An application of grounded theory. Working Paper: 1-24.
- Schneider, K. and Gugerty, M. K., (2011). "Agricultural Productivity and Poverty Reduction: Linkages and Pathways", *The Evans School Review*, 1(1): 56-74.
- Schultz, T.W., (1988). "Transforming Traditional Agriculture", *American Journal of Agricultural Economics*, 70(1): 198-200.

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