

Effect Of Free Market Price On Khat Production On Economic Growth Of Household In West Hararghe Zone, Ethiopia

Tamiru Gabusho Ayana

Oda Bultum University, School of Business and Economics,
Department of Economics, Lecturer, Chiro, Ethiopia
Address of author, Ethiopia, +251934030247/921831715
tame0934030247@gmail.com

Abstract: The chief determination of this study was to analysis effect free market price of Khat on economic growth of households in west hararghe zone in some woreda. The researchers were used for the methodology of the study adopted the neoclassical growth model to theoretical framework development to identify optimization problem of price liberalization investigating effects of free market on economic growth in some woreda, the researchers used Ordinary Least Square method. The study used ordinary least squares regression and found khat production price liberalization had a significant negative effect on economic growth of households.

Key words: Free market, Index, Khat, West Hararghe,

1. Background

In the different world countries, the rise in Khat prices has increased concerns about the long run economic growth. In West Hararghe Zone, Khat price liberalization reform was implemented with aim of regulating the Khat sector, enhancing competition, efficiency, choice and stability in the Khat market and promoting growth and development of Khat sector and West Hararghe Zone's economy (Ministry of Khat, 2012). The notion of liberalization has changed the operations in the legal and economic framework of the Khat market in the world. West Hararghe Zone government introduced liberalization in the Khat sector in piecemeal with the first one in 1990 targeting the petroleum sector, the second one in 1996 targeting the electricity sector and the third one in 2002 that targeted the whole Khat sector. The main reason for liberalizing the Khat sector was to stabilize the prices in the Khat market, to increase accessibility and to increase competition (Ministry of Khat, 2003). In 2002, the estimated total biomass resource demand was 35 million metric tons against a supply of 15 million metric tons. The development projects proposed in West Hararghe Zone's Vision 2030 will increase demand of Khat in West Hararghe Zone. Currently, the price of Khat is higher in West Hararghe Zone compared to competitors such as South Africa, Ethiopia and Nigeria. West Hararghe Zone must therefore produce more Khat at lower cost and increase Khat consumption efficiency in order to be more competitive (World Bank, 2010). In Vision 2030, West Hararghe Zone government has committed to continue with institutional reforms in Khat sector provision of strong regulatory framework separation of generation from distribution encouraging more private investors to invest in power generation. In line with West Hararghe Zone's Vision 2030, the West Hararghe Zone government has embarked on the search for new sources of Khat through exploitation of geothermal power, renewable Khat sources and coal improvement of Khat production in the already existing Khat plants. All these developments aim to stabilize the liberalized Khat prices and supply of Khat. The Ministry of Khat argued that Khat price liberalization is a stimulus for development of the Khat generating

projects by the government and the private sector. Although the planned for Khat price liberalization were negatively affect the economic growth in West Hararghe Zone.

2. Statement of the Problem

The West Hararghe Zone government aims at improving its economic growth level and sustaining it at a double-digit rate. In line with the West Hararghe Zone's Vision 2030, it has aimed at having an economic growth rate of above 10 percent and maintaining it through to year 2030 (Ministry of Planning and National Development, 2007). To meet economic growth expectation, West Hararghe Zone government has introduced measures among them being Khat reform of Khat price liberalization. However, despite the West Hararghe Zone government's effort in carrying out reforms in different sectors such the implementation the Khat reform measure of Khat price liberalization in 2002, the economy has not experienced double digit economic growth rate. Government has not met its economic growth economic growth rate, but still on developments in Khat sector, stability in supply and prices of Khat and favorable liberalized Khat prices that results from Khat price liberalization. The West Hararghe Zone Khat sector contributes about 9.49 percent to GDP with the petroleum sector, electricity sector and fuel wood sector contributing 8.4 percent, 0.6 percent and 0.49 percent respectively (Ministry of Khat,2003). Should the Khat price liberalization policy not meet its economic objectives, then double-digit economic growth rate in West Hararghe Zone will be difficult to achieve. Need therefore arose to investigate why, despite West Hararghe zone government's reform in Khat through price liberalization, but still below double-digit level. In response to this problem, the study proposed to investigating impact of price liberalization on economic growth in West Hararghe Zone.

3. Research Methodology

The main purpose of this study was to determine effect of Khat price liberalization on economic growth in West Hararghe Zone. The study divided the study period into two periods that is the period of Khat price liberalization and period of no Khat price liberalization to find out the effects of non-liberalized and liberalized Khat prices on economic growth in two periods. The period of no Khat price liberalization was from 1980 to 2001 and from 2011 to 2014 while the period of Khat price liberalization was from 2002 to 2010. The study utilized quantitative econometric analysis, using OLS regression and stability analysis to evaluate and identify the relationship that existed between the main variables. Other appropriate econometric methods of testing that are used included diagnostic techniques and stationary tests. This study added to the existing literature by exploring deep into the role of the liberalized Khat price on economic growth and identifying both theoretically and empirically the economic growth impact of these liberalized Khat prices.

4. Theoretical Framework of the model

The study was investigating the impact of Khat price liberalization on economic growth in West Hararghe Zone. It adopted the neoclassical growth model. As shown in the literature review, Khat is an important factor in economic growth of economy such as West Hararghe Zone. The literature reviewed showed that Khat use and supply is affected by the Khat prices that prevail in the market among other determinants. The derived production function of the neoclassical growth theory (Solow, 1956) is shown as:

$$Y = f(A, K, L) \dots\dots\dots (1)$$

Where Y is aggregate real output, K is capital stock, L is labor, A is technology or technological progress. Technology (A) is factor productivity that is endogenous and related to Khat. Most forms of technology require Khat to power it (Stiglitz, 1974). According to the law of thermo dynamics, “no production process can be driven without conversion of Khat”. Using this justification, the neoclassical growth model is now a function of technology, labor, capital and Khat. Khat is treated as an exogenous variable and if it is made as a component of production technology, the model in equation (1) becomes;

$$Y = f(A, K, L, E) \dots\dots\dots (2)$$

The final output Y is assembled from various intermediate goods xi where i is the index of the variety of goods and mx is the total output of m firms in the economy (Hicks, 1932). These intermediate goods are manufactured using labor and Khat as the primary inputs. The price of x goods is given by mark-up over marginal cost shown as:

$$Px = (VLX \cdot w + VEX \cdot PE) \beta \dots\dots\dots (3)$$

Where V’s are the Leontief input factors, Px is the price of good x, PE is the price of Khat, β is marginal cost, w is wage for labor, LX and EX are respectively index for labor and Khat used in production of good x. Applying a logarithmic transformation to linearize equation (4), the

econometric equation is written as: $Ln Y = \beta_0 Ln A + \beta_1 Ln E + \beta_2 Ln K + \beta_3 Ln L + \epsilon \dots\dots\dots (4)$

Where ε is the random error in the model. Popp (2002) argued that the technology can be captured by the trend effect because of lack of exact data on it and because it is not directly and easily measurable. Applying this justification in this study and letting Y to stand for Ln Y, E to stand for Ln E, K to stand for Ln K and L to stand for Ln L, equation (5) is rewritten as:
 $Y = \beta_0 + \beta_1 E + \beta_2 K + \beta_3 L + \epsilon \dots\dots\dots (5)$

The study used the expression for interior solutions to the unconstrained producer spending optimization problem (Asafu-Adjaye, 2000) to get the real prices:

$$Y = \beta_0 + \beta_1 Ep + \beta_2 k + \beta_3 w + \epsilon \dots\dots\dots (6)$$

Where GDP is the gross domestic product and a representation of the theoretical output Y, Ep is Khat price, k is capital price, w is labor price, β0 is the trend effect, β1, β2 and β3 are parameters of the model.

5. The Empirical Models for the study

To derive the empirical model, the study considered equation (6) as a starting point. The study preferred to use the price indices instead of real prices because the price indices are weighted on their importance to the economy unlike real prices which do not consider weights (Kaufmann, 1992). Applying Laspeyres index calculation on each variable of equation (6) to get;

$$GDP_r = \beta_0 + \beta_1 E_{pi} + \beta_2 k_i + \beta_3 w_i + \epsilon \dots\dots\dots (7)$$

Where GDP_r is GDP growth rate, E_{pi} is Khat price index, k_i is capital price index, w_i is labor price index, β0 is trend effect and β1, β2 and β3 are coefficients. The period of the study was divided into two that is (i) the period of no implementation of Khat price liberalization (1980 to 2001 and 2011 to 2014) and (ii) the period of implementation of Khat price liberalization (2002 to 2010). A dummy variable (D) was used to factor these periods in equation (7). The empirical model is expressed as;

$$GDP_r = \beta_0 + \beta_1 E_{pi} + \beta_2 k_i + \beta_3 w_i + \beta_4 D_i + \epsilon \dots\dots\dots (8)$$

Where β4 is a regression coefficient of the dummy variable Di and

Di = {01 for the period p of Khat price liberalization. To investigate the effects of Khat price liberalization on economic growth in West Hararghe Zone, the study used Ordinary Least Square (OLS) method assuming a well-behaved error term (ε). The study used OLS method because it provides super consistent estimates of the autoregressive coefficient. To study the magnitude of the effects of Khat price liberalization on economic growth, the study used regression model estimation which gives Khat price liberalization coefficient. To find out whether there was a significant difference in stability of Khat price before and liberalization of Khat price, the study used dummy variable and used t-test to test its significance.

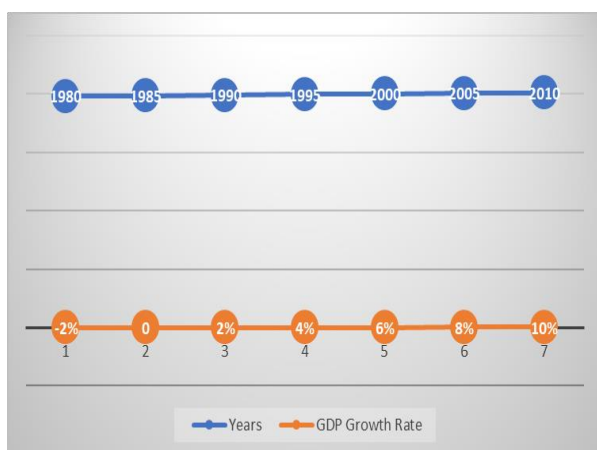
6. Empirical Findings

Table .1: Descriptive statistics of the variables

Variable	Observation	Mean	Std dev.	Minimum	Maximum
GDP growth rate	35	3.7277	2.3393	-0.7995	8.4057

The study used 35 observations of variable. GDP growth rate had a mean of 3.7277, standard deviation of 2.3393 and minimum and maximum of -0.7995 and 8.4057 in 1992 and 2010 respectively. Khat price index had a mean of 12.5207 and standard deviation of 6.6135. Capital price index had a mean and standard deviation of 18.6558 and 8.4115 respectively. Labor price index had a mean, standard deviation, minimum and maximum of 1.3143, 8.6024, -22.1000 and 19.7000 respectively.

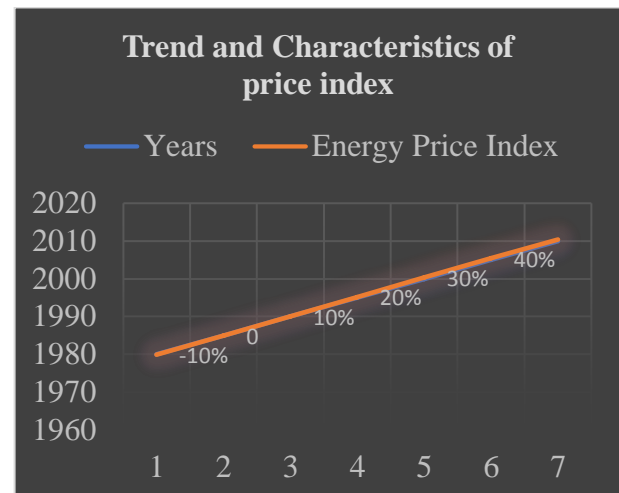
Figure 1: Trend in GDP Growth Rate in West Hararghe Zone (1980-2010)



Source: West Hararghe Zone Statistical Abstracts, 2015

Trend and characteristics of Khat price index shows the trend of Khat price index. The Khat price index shows cyclical movement but generally downward sloping. Between the year 1986 and 1994, Khat price index experienced positive gains followed by a drastic drop from 29 percent in 1995 to 2 percent in 1996. After year 1996, the Khat price index experienced an almost systematic increase and decrease all through to 2014. The lowest Khat price index was negative 4 percent in 2010.

Figure 2: Trend in GDP Growth Rate and Khat Price Index in West Hararghe Zone (1980-2010)



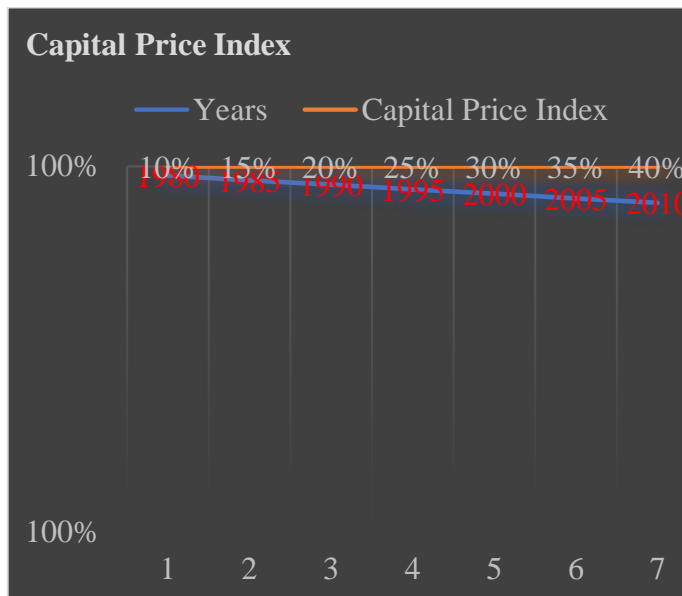
Source: West Hararghe Zone Statistical Abstracts, 2015

The West Hararghe Zone's Khat price index experienced steady increases between 1986 and 1994, 2002 and 2005 and 2007 and 2008. Given that petroleum has the most weight in the West Hararghe Zone's Khat price index, steady increases attributed to the numerous increases in oil prices experienced around the world in the same period from 1987 to 1990 and from 2003 to 2008. This can also be attributed to piecemeal liberalization of Khat price in West Hararghe Zone's Khat sector that targeted the petroleum subsector. The decrease in Khat prices can also be attributed to increase in economic activities and economic growth as seen in 2010 which had the lowest Khat price index of negative 4 percent and highest economic growth rate of 8.4 percent.

7. Characteristics of Capital Price Index

According to this study shows that the trend and characteristics of capital price index experienced a steady increase from 1980 to 1994 followed by a steady decline from 1994 to 2004. Between 2004 and 2014, the capital price index experienced slightly steady increase. The lowest capital price index during the study period was 10.6 percent in 1980 while the highest capital price index was 36.2 percent in 1994. The trend can be attributed to level of economic growth rate and Khat price index in the economy. When the economic growth rate is low and Khat price index is high, capital price index increases for example in 1982 and 1994.

Figure 3: Trend in Capital Price Index in West Hararghe Zone (1980-2010)



Source: West Hararghe Zone Statistics, 2015

8. Correlation Analysis Results

The correlation analysis on the variables was to find out the degree of association among the variables. It also provides a check on whether the multicollinearity problem existed in the data (Gujarati & Porter, 2009). The correlation coefficients showed the direction of relationship and the strength of the relationship between two variables in the model.

9. Stationarity Test Results

To examine whether the series were stationary or not, the study conducted Augmented Dickey Fuller (ADF) unit root test and Phillips-Perron (PP) unit root test on the variables of the empirical model at levels with intercept and trend. The study used Phillips-Perron test because of structural change and ADF test ensures that the errors are white-noise by including the appropriate number of lags (Dawn et al., 2009).

10. Effects of Khat Price Liberalization on Economic Growth

The model of the study had five variables namely GDP growth rate, Khat price index, capital price index, labor price index and the dummy variable representing the period of Khat price liberalization and the period of no liberalization of Khat price. GDP growth rate was the dependent variable while the Khat price index, capital price index and labor price index were the explanatory variable. The first objective of the study was to find the effects of Khat price liberalization on economic growth in West Hararghe Zone. The study used ordinary least squares regression to estimate the coefficients of the variables of the model. The below Table (-) presented the results of the ordinary least square regression. The study found that the coefficient of Khat price index was negative 0.0837 with corresponding t-value of negative 3.4015 and a probability value of 0.0134 implying that the coefficient is significant. The coefficient of Khat price index suggested that Khat price was negatively related to

economic growth. The coefficient also showed that a one unit increase in Khat price would decrease the economic growth by 0.0837 units. The probability value of 0.0134 showed that amongst the independent variables of the study, Khat price index was the most significant in explaining GDP growth rate. The result agreed with expectation of study that Khat price would have a negative relationship with economic growth. The result was consistent with Bernanke's (2006) findings that stressed that an increase in Khat prices slows down economic growth. The result was also in support of conclusions drawn by Yet Kiner (2003) found that Khat prices had a negative and significant effect on economic growth in the long run. The result also concurred with that of Asafu-Adjaye (2000) who found that increased Khat prices dampen economic growth in developing countries. The study used dummy variable to differentiate whether the Khat price is liberalized or not liberalized. The coefficient of the dummy variables was negative 0.1607 with a t-value of negative 3.1702 and probability value of 0.0367. The dummy variable took the value of 0 or 1 to indicate Khat price being not liberalized and liberalized respectively. The probability value of 0.0367 suggested that Khat price liberalization was significant in explaining economic growth in West Hararghe Zone. The dummy variable was found to be negatively related to economic growth and the coefficient of the dummy variable suggested Khat price liberalization resulted in a decrease in economic growth in West Hararghe Zone. The result was attributed to fact oil and petroleum subsector made the largest weight in the Khat price index and oligopolistic nature of players in oil and petroleum subsector usually do not pass cost reductions to consumers. The result showed that Khat price liberalization had significant negative effects on economic growth in West Hararghe Zone. The finding is in contrast to World Bank (2010) findings which indicated that liberalization of electricity prices promoted economic activities which in turn increased economic growth. The finding also disagreed with that of United Nations Economic Commission for Europe (2012) which found that liberalization of natural gas market in European region led to improved Khat efficiency and security and increased economic growth. The coefficient of the capital price index was negative 0.1408 with a t-value of negative 2.3297 and a probability value of 0.0267. The probability value of 0.0267 showed that capital price index was significant in explaining GDP growth rate. The coefficient was negative, suggesting negative relationship between capital price index and economic growth rate. This confirmed the expectation of the study, which was that capital price was negatively related to economic growth in West Hararghe Zone. The finding also supports Solow's (1956) findings that an increase in capital price dampened economic growth of an economy. The result concurs with Aghion and Howitt (2009) who concluded that there is a negative relationship between capital price and economic growth. The coefficient of labor price index showed the effect of labor price on economic growth. The labor price index had a coefficient of 0.0331 with a t-value of 0.6201 and a probability value of 0.5393. The probability value of 0.5393 showed that labor price index was not significant in explaining the GDP growth rate.

11. Conclusion and Recommendation

Khat is an important component in promoting growth of any economy such as in West Hararghe Zone. The way Khat affects economic growth of an economy depends on several factors among them being the type of economy, the quality of Khat, the type of Khat and the price of Khat. Khat being a normal good, its price affects its demand and consumption and in turn affects growth of an economy. West Hararghe Zone implemented Khat sector reform of price liberalization as one of measures will enable it to reach and sustain double digit economic growth rate as in West Hararghe Zone's Vision 2030. The study acknowledged that Khat and in particular Khat price was not the only factor that affected the economic growth of a country. The study, therefore, included other variable that is labor and capital as is in the neoclassical growth theory. The study also took into account the different periods under which Khat price liberalization policy was implemented and used the dummy variable to account for this in the model of the study. The study collected the data for these variables, over a 35-year period, from the Statistical Abstracts of West Hararghe Zone. The study period used was from 1980 to 2014 and was deemed sufficient for the study. The findings indicated that Khat price liberalization had significant negative effects on economic growth in West Hararghe Zone. The study also recommends that other studies be done on different Khat subsectors, such as petroleum subsector and electricity subsector, so as to compare the results and also to know the Khat subsector on which price liberalization policies have best impacts on economic growth. The study found that Khat price liberalization had a significant negative impact on economic growth in West Hararghe Zone. The study, recommends that West Hararghe zone government reevaluate implementation of the Khat sector reform of Khat price liberalization. The study also recommends that the West Hararghe zone government should encourage reforms in other sectors of the economy because of the fact that the GDP growth rate did not reach double digit rate throughout the study period. Most forms of technology require Khat to power it. The study recommends that a similar study be done using the same methodology, but with technology as an additional variable. This would help explain how Khat and Khat price effects on technology affects economic growth of the country. The study also recommends that government should develop other Khat sources such as nuclear Khat, then do a similar study.

Bibliography

- [1]. Abosedra, S. & Baghestani, H. (1991). New evidence on the causal relationship between United States Khat consumption and gross national product. *Journal of Khat and Development*, 14, 285-292.
- [2]. Aghion, P. & Howitt, P. (2009). *The Economics of Growth*. Cambridge, MA: MIT Press.
- [3]. Akarca, A. & Long, T. (1980). On the relationship between Khat and GNP: A reexamination. *Journal of Khat and Development*, 5, 326-331.
- [4]. Alam M. S. (2006). *Economic growth with Khat* (2nd ed.). Toronto: Maclean world Publication limited.
- [5]. Armitage F. A. (1990). *On Wood fuel, Total Khat Consumption and GDP in Ghana: A Study of Trends and Causal Relations*. Boston MA: Center for Khat and Environmental Studies, Boston University.
- [6]. Asafu-Adjaye, J. (2000). 'The relationship between Khat consumption, Khat prices and economic growth: time series evidence from Asian developing countries. *Khat Economics* 22, 615-625.
- [7]. Bernanke, B.S. (2006a). "Khat and the Economy," speech to Economic Club of Chicago, June 15.
- [8]. Birol, F. (2007). *World Khat prospects and challenges*. Melbourne: Blackwell publishing.
- [9]. Burbridge, J. & Harrison, A. (1984). Testing for the effects of oil price rises using vector autoregressions. *International Economic Review*, 25, 459-484.49
- [10]. Costantino, V. & Martini, C. (2010). The causality between Khat consumption and economic growth: A multi-sectoral analysis using non-stationary cointegrated panel data. *Khat Economics*, 32, 591-603.
- [11]. Cleveland, C. J., Costanza, R., Hall, C. A. S., & Kaufmann, R. (1984). Khat and the U.S. economy: a biophysical perspective. *Science*, 255, 890 - 897.
- [12]. Damodar G. & Dawn P. (2009). *Basic Econometrics* (5th ed.). New York: McGraw-Hill.
- [13]. Dasgupta P. S. & Heal, G. M. (1979). *Economic Theory and Exhaustible Resources*. Oxford: Cambridge University Press.
- [14]. Dogan, E. (2014). 'Khat Consumption and Economic Growth: Evidence from Low Income Countries in Sub-Saharan Africa'. *International Journal of Khat Economics and Policy*, Vol. 4, No. 2, 2014.
- [15]. Enders, W. (2014). *Applied econometric time series* (4th ed.). USA: Wiley.
- [16]. Fowowe, B. (2012). 'Khat consumption and real GDP: Panel co-integration and causality tests for sub-Saharan African countries. *Journal of Khat in Southern Africa*, Vol. 23, No. 1, February 2012.
- [17]. Gbadebo, O. O. & Chinedu, O. (2009). Does Khat consumption contribute to economic

- performance? Empirical evidence from Nigeria. East-West Journal of Economics and Business.
- [18]. Gever, J., Kaufmann, R., Skole, D., & Vorosmarty, C., (1986). *Beyond Oil: The Threat to Food and Fuel in the Coming Decades*. Cambridge: Ballinger.
- [19]. Ghali, K. H. & El-Sakka, M. I. T. (2004). Khat use and output growth in Canada: multivariate cointegration analysis. *Khat Economics*, 26, 225-238.
- [20]. Granger C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37, 424-438.
- [21]. Hamilton, J. D. (2009). Causes and Consequences of the Oil Shock of 2007–08. Brookings Papers on Economic Activity, 2009(1), 215-261.
- [22]. Hamilton, J. (1994). *Time series analysis*. Princeton, New Jersey: Princeton University Press.
- [23]. Hamilton, J. D. (1983). Oil and the macroeconomy since World War II. *Journal of Political Economy*, 91, 228-248.
- [24]. Hendry, D. F. & Julius. K. (2000). Explaining cointegration analysis: Part 1. *Khat Journal* 21(1), 1-42.
- [25]. Hicks, J. R. (1932). *The Theory of Wages*. London: Macmillan Publishers.
- [26]. Hondroyiannis, G., Lolos, S. & Papapetrou, E. (2002). Khat consumption and economic growth: assessing the evidence from Greece. *Khat Economics*, 24, 319-336.
- [27]. International Khat Agency. (2004). *World Khat Outlook*. Paris: Cooler Heads Coalition.
- [28]. Jorgenson, D.W. (1984). The role of Khat in productivity growth. *Khat Journal*, 5(3), 11-26.
- [29]. Kamien M. I. & Schwartz, N. L. (1982). The role of common property resources in optimal planning models with exhaustible resources, in V. K. Smith and J. V. Krutilla (eds.), *Explorations in Natural Resource Economics*. Baltimore: Johns Hopkins University Press.
- [30]. Kaufmann, R. K. (1992). A biophysical analysis of the Khat: real GDP ratio: implications for substitution and technical change. *Ecol Econ*, 6, 35 - 56. West Hararghe Zone National Bureau of Statistics. (Various Issues). *Statistical Abstract*. Nairobi: Government Printer.
- [31]. West Hararghe Zone Institute for Public Policy Research and Analysis. (2005). *A comprehensive study and analysis on Khat consumption patterns in West Hararghe Zone*. Nairobi: KIPPRA.
- [32]. Kraft, J. & Kraft, A. (1978). On the relationship between Khat and GNP. *Journal of Khat and Development*, 3, 401-403.
- [33]. Lee, C. C. & Chang, C. P. (2008). Khat consumption and economic growth in Asian economies: A more comprehensive analysis using panel data. *Resource and Khat Economics*, 30(1), 50-65.