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THE IMPACT OF GLOBALIZATION ON THE CAPITAL MARKET IN ROMANIA

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Abstract:
The study examined the impact of globalization on the capital market operation in Romania, using the Bucharest Stock Exchange as a case study. In this paper we analyze the impact of globalization on the capital market in Romania using different tests and methods, taking into account the other studies on this subject. We exploit daily data of stock exchange for the period of August 2011- March 2017 and the variables included in the research are BETPLUS, BET-XT, BET-FI, BET-NG, BET-BK, BET-XT-TR, SPX, DJI, N225 and STOXX50E. In the course of examination, it was discovered that there are much influence of globalization on the capital market operations in Romania.

Keywords: economic globalization, capital market development, VAR, causality

JEL Classification: C32, F630, G10, G15

1.Introduction
The international economy is continually restructuring, impacting all nations, which will have to adapt to the changes taking place worldwide. Among the most important changes manifested in the global financial markets were those related to the phenomenon of accelerating their integration and globalization. This evolution directly caused by the liberalization of national financial markets, fast technological progress and huge jumps in telecommunications has led to occurrence of new investment opportunities and financing for financial market participants worldwide.

Romanian capital market falls among emerging markets, initiating a process of economic growth but not managing to reach a high level of development, characterized by a significant degree of economic and political instability. There are significant differences between the size of the Bucharest Stock Exchange and the dimensions of other markets such as those in Europe, U.S. and Asia, but as the domestic capital market is maturing, the correlation between this and other emerging economies become stronger and begin to be attractive for foreign investors.

2.Literature Review
Erdinc and Milla (2009) investigated whether there is cointegration between stock markets (France, Germany and UK). For the analysis was used monthly data of stock exchange for the period 1991–2006. The cointegration tests indicate that there exists a long term relationship between European countries.

Ishmael, Oluwalami, James and Osamor (2012) examined the impact of globalization on the Nigerian Stock Exchange and they discovered that globalization influence the capital market operations.

Liow and Ye (2012) showed that economic globalization could be one of the key driving forces of capital market integration. For their study used monthly observations (interbank interest rates, exchange rates and consumer price indices) from 1996 to 2011 for U.S., United Kingdom, China, Singapore, Taiwan, Hong Kong and Japan.

Ray (2012) analyzed the relationship between globalization and economic growth in India using annual data for the period, 1990-1991 to 2010-2011. Variables have long-run equilibrium relationship with economic growth and the Granger causality test show a bidirectional causality.

Munteanu, Filip and Pece (2014) researched the relationship between the returns obtained in 12 EEC (Emerging European Countries) and U.S., in the period 2005-2013, using a VECM and a Granger causality test. The results obtained show that between U.S. and EEC markets exists a strongly connection.

Another study of the effects of globalization on the capital market in Nigeria was made by Nwezeaku and Akujuobi (2015). They analyzed the relationship between globalization and the capital market development in Nigeria and the period analyzed is 1980-2013. They used OLS method, cointegration and causality tests and the variables included in their study are import, export, trade openness, foreign investment inflows and capital market development. The results indicate that the export causes market capitalization, and vice versa, and between import and market capitalization exists a unidirectional relationship. Nwezeaku and Akujuobi recommend paying attention on policy directions since the effect of globalization can be a positive one, but also it can have a negative effect on economic growth depending on the policy directions taken.

Nasreen, Mahalik, Abbas and Shahbaz (2015) find a significant effects of the financial development and changes in economic globalization on economic growth in the 1989-2014 period for 23 European countries, using a VAR and Granger causality test and the series used in analysis are domestic credit, private credit, money supply, stock market capitalization, turnover ratio and value traded. The authors also find that stock market indicators Granger cause economic growth.

Kilic (2015) analyzed the effects of economic, social and political globalization on economic growth for 74 developed countries, between 1981-2011 period. The analysis showed that between social globalization and economic growth is a negative relationship, while between economic/ political globalization and economic growth is a positive relationship. The Granger causality test showed the presence of a bidirectional relationship between economic globalization and economic growth and a unidirectional relationship between social globalization and economic growth.

3.Data and methodology

Estimates are made using daily data from August 2011 to March 2017. We have the following data series used to investigate the impact of globalization on the capital market: BETPLUS, BET-XT, BET-FI, BET-NG, BET-BK, BET-TR, SPX, DJI, N225 and STOXX50E. In an attempt to see what is the effect of globalization on the capital market in Romania we decided to take into consideration six indices representing Romania and four indexes representing the largest capital markets such as Europe, U.S. and Asia.

We use logarithmic data series to remove the presence of heteroscedasticity. In order to study the relationship between capital markets in Europe, U.S., Asia and Romania, we applied VAR and causality tests.

Initially we will study both the stationarity of the data unit root tests and their order of integration. We will use the Augmented Dickey-Fuller test to check-ADF stationarity. Augmented Dickey Fuller is used to determine the order of integration, and the null hypothesis is the existence of a unit root. To determine the optimal number of lags, we used criteria laid down by LR sequential tests, Akaike criterion, Schwarz and Hanna-Quinn Criterion tests.

4.Results

According to ADF stationary test, all ten variables are integrated of order zero. By using VAR equations we can analyse the causality between these variables and by applying these econometric models will allow us to verify the existence of the relationship of short term between variables. Below are the equations obtained by applying VAR. We aimed to investigate separately the relationship between the six Romanian stock indices with stock indices representing the capital market in U.S., Asia and Europe.

Table 1 VAR equations

BETPLUS =C(1)*BETPLUS(-1) + C(2)*BETPLUS(-2) + C(3)*DJI(-1) + C(4)*DJI(-2) + C(5)*N225(-1) + C(6)*N225(-2) + C(7)*SPX(-1) + C(8)*SPX(-2) + C(9)*STOXX50E(-1) + C(10)*STOXX50E(-2) + C(11)
BET-XT = C(1)*BETXT(-1) + C(2)*DJI(-1) + C(3)*N225(-1) + C(4)*SPX(-1) + C(5)*STOXX50E(-1) + C(6)
BET-FI = C(1)*BETFI(-1) + C(2)*BETFI(-2) + C(3)*DJI(-1) + C(4)*DJI(-2) + C(5)*N225(-1) + C(6)*N225(-2) + C(7)*SPX(-1) + C(8)*SPX(-2) + C(9)*STOXX50E(-1) + C(10)*STOXX50E(-2) + C(11)
BET-NG = C(1)*BETNG(-1) + C(2)*DJI(-1) + C(3)*N225(-1) + C(4)*SPX(-1) + C(5)*STOXX50E(-1) + C(6)
BET-BK = C(1)*BETBK(-1) + C(2)*BETBK(-2) + C(3)*DJI(-1) + C(4)*DJI(-2) + C(5)*N225(-1) + C(6)*N225(-2) + C(7)*SPX(-1) + C(8)*SPX(-2) + C(9)*STOXX50E(-1) + C(10)*STOXX50E(-2) + C(11)
BET-XT-TR = C(1)*BETTR(-1) + C(2)*BETTR(-2) + C(3)*DJI(-1) + C(4)*DJI(-2) + C(5)*N225(-1) + C(6)*N225(-2) + C(7)*SPX(-1) + C(8)*SPX(-2) + C(9)*STOXX50E(-1) + C(10)*STOXX50E(-2) + C(11)

Source: Authors' work

C (1) is the term error correction or adjustment speed towards equilibrium. According to the results obtained from estimating the six equations, the coefficient C (1) is not negative (but significant in the most cases), which mean the absence of long-term causalities from international capital markets to the capital market in Romania. Causality of short term can be verify by applying the Wald test. If the probability recorded is below the rate of 5%, this allows us to reject the null hypothesis, and that we can affirm the presence of a short term causality from the international markets to the Romanian market.

The empirical results confirm the presence of short term causality from U.S. and Europe to Romania. In the analyzed period, U.S. stock indices such as DJI and SPX shows causality in the short-term for BET-XT index. The European capital market influence over capital market in Romania is confirmed by the Wald test, especially on BETPLUS, BET-XT, BET-BK and BET-XT-TR. Indices BET-FI and BET-NG records a probability that is above the rate of 5%, which allows us to accept the null hypothesis, that we can affirm the absence of causality in the short term from foreign capital markets to Romania.

The variance decomposition for stock indices is shown in table below. This is because the influence of globalization on capital market is the main issue of concern in the study. The role of the variance decomposition is to ascertain the proportion of forecast error variance in one variable explained by its innovation and other variables. It is a device for measuring the amount of shock received by the variable from itself and other variable.

Table 2 Variance decomposition for Romanian stock indices

Period	BETPLUS	DJI	N225	SPX	STOXX50E
2	98.59763	0.000750	0.116033	0.253767	1.031824
3	96.32394	1.640596	0.158869	0.463872	1.412728
12	96.29753	1.646596	0.165562	0.476219	1.414094
	BETFI	**DJI**	**N225**	**SPX**	**STOXX50E**
2	99.60367	0.274350	0.046782	0.051011	0.024183
3	97.19131	2.571377	0.045972	0.112016	0.079323
12	97.17509	2.577812	0.050425	0.112419	0.084250
	BETXT	**DJI**	**N225**	**SPX**	**STOXX50E**
2	98.48338	0.290887	0.168487	0.485902	0.571349
3	98.46909	0.291379	0.168446	0.491172	0.579908
12	98.46892	0.291395	0.168476	0.491275	0.579938
	BETNG	**DJI**	**N225**	**SPX**	**STOXX50E**
2	99.31389	0.023949	0.220300	0.264359	0.177504

3	99.31260	0.023951	0.220893	0.264825	0.177732
12	99.31259	0.023953	0.220895	0.264830	0.177732
	BETBK	**DJI**	**N225**	**SPX**	**STOXX50E**
2	98.84139	1.056728	0.060803	0.040961	0.000115
3	97.38594	2.401575	0.152723	0.040623	0.019139
12	97.36772	2.405201	0.159448	0.047852	0.019775
	BET-XT-TR	**DJI**	**N225**	**SPX**	**STOXX50E**
2	96.83607	2.461249	0.639366	0.053482	0.009837
3	92.30551	5.816922	1.711392	0.137955	0.028225
12	92.19637	5.824412	1.746075	0.192099	0.041046

Source: Authors' work

The forecast horizon is in months. In the long-term the U.S. stock market represented by DJI contribute to over 1.6% of the BETPLUS forecast error variance, and SPX contribute about 0.5% of the BETPLUS forecast error variance. N225 index become stronger in the long-run but is practically insignificant in explaining fluctuations in Romanian's capital market evolution.

The result shows that BET-XT-TR variance decomposition receives the largest shock of 5.82% from DJI, followed by 1.74% from N225, which are the biggest contributions from U.S. stock market and Asian stock market. Other indices which present a higher contribution from U.S. stock market are BET-FI and BET-BK.

Figure 1 Impulse-response function for the Romanian indices
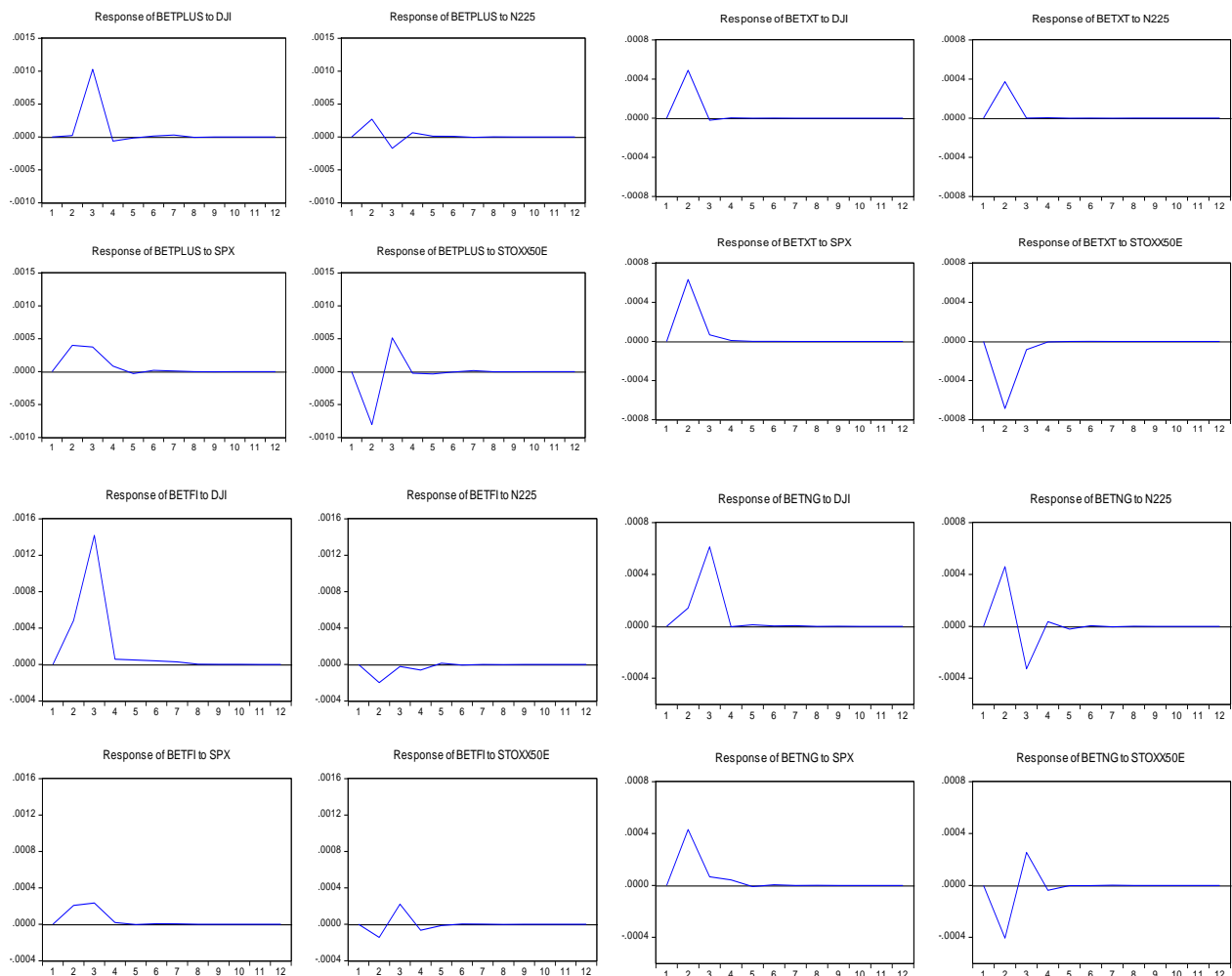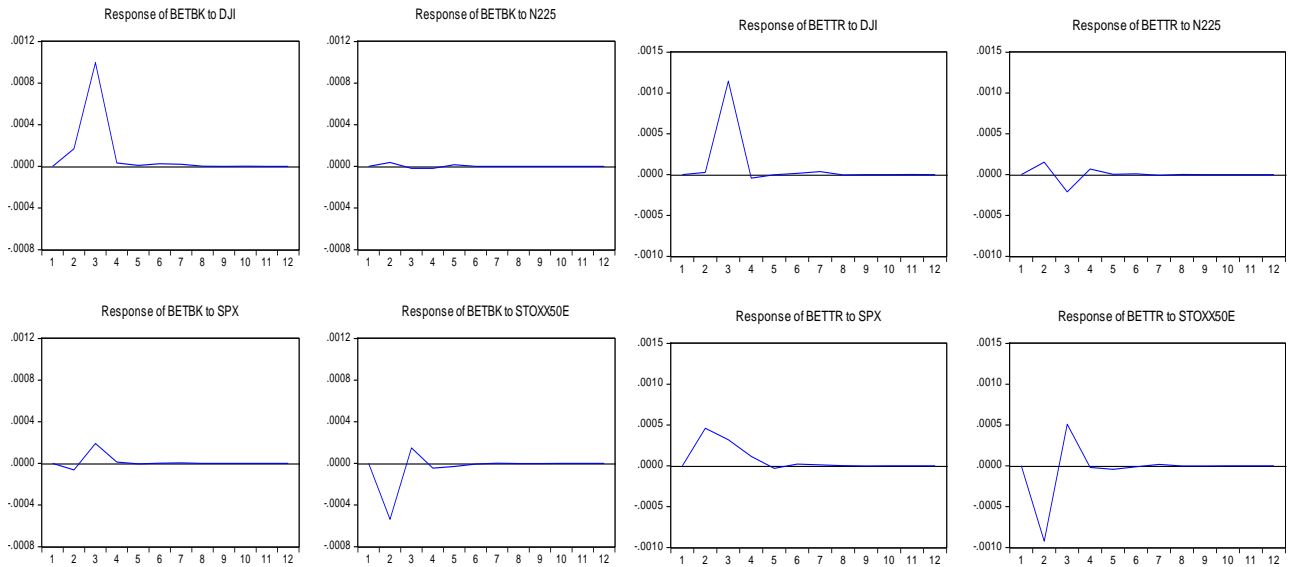
Source: Authors' work

Except BET-NG, the Granger causality test confirms the existence of a bidirectional causality between stock indexes representing the U.S. capital market and stock indexes in Romania. The empirical results from Granger causality tests highlight no causality from the Asian capital market. An unidirectional causal relationship has been identified from the European capital market to Romanian capital market, excepting BET-NG and BET-FI. Results confirm that the capital market in Romania is influenced by external markets, with the strongest impact from U.S..

5.Conclusions

The objective of the study is to identify if there exists a significant relationship between the returns obtained in the U.S., Asia and Europe stock market and those obtained in the Romanian stock market. Furthermore, we aim at identifying the causality that describes the relationship between the returns obtained in distinctive stock markets, using six indices representing the capital market in Romania. The results provided present a general picture of stock market globalization suggested by both techniques approached: VAR statistically significant coefficients on the one side and by the rejection of the null in the case of Granger causality test, on the other.

We observe that the direction of causality between U.S. stock market and Romania stock market is generally bidirectional (causality runs in both directions). Another result obtained is the presence of a unidirectional causal relationship between European stock market to Romanian stock market. Even though the results reveal a high degree of stock market globalization, further, detailed information about stock market interconnection should be investigated.

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ECONOMIC AND SOCIAL IMPLICATIONS OF DEMOGRAPHIC EVOLUTIONS IN ROMANIA AND EGYPT

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Abstract:

The world population in general is faced with a slow but continuous process of demographic ageing. Under these conditions, an increase is recorded in the 'pressure' exercised by the elderly on the adult and potentially active population, implicitly on some important systems of the society (health, social assistance, social insurances budget), with implications on the economic and social policy.

The change in the age structure of the population as result of the particularities of demographic evolution, of Romania's population ageing and of population increase in Egypt has economic, social and many other outcomes, both at national and regional level. These consequences, as a rule, have a long term character, reaching higher shares or diminishing from one stage to another of the demographic evolution, depending on the type of age structure. The consequences of the changes in the age structure of the population display a wide range, including all age groups and leaving their fingerprint on the multiple social processes. The changes in the age structure of the population imply change in the general structure of social needs. The increase in the weight of elderly or of young individuals in the population structure triggers the need of increasing the number of health and social care institutions, including here the training of specialized personnel. Important changes related to the change in the population structure take place also in other spheres of human life: personal, family and professional life, in economy, politics and culture, etc.

The paper presents a brief analysis of the determinant factors of population ageing in Romania and of the demographic changes in Egypt, as well as the economic and social consequences of this phenomenon's expansion in the two countries.

Key-words: demographic ageing, economic consequences, social effects

JEL Classification: E20, D60, J10, J12

Introduction

In the 21st century, one of the most stringent issues of mankind is the one of population's demographic ageing with important implications on the socio-economic development in various regions of the world. Both in developed countries, and in developing countries the weight of elderly in the population structure increases at high rates, imposing the necessity of developing specific policies in the field.

The increase in the weight of the elderly in the population structure, the change, preservation and use of their functional capacities open new possibilities for this population group regarding aspects related to the economic, social, cultural and spiritual life.

The last 27 years were characterised by the continuing decrease of Romania's population. The rapid and significant decreases in the birth rate, the recrudescence of mortality, and the negative external migration have dramatically changed the demographic landscape in Romania.

The year 2015 is the 26th year of demographic decline, as Romania lost during this year 3.38 million inhabitants, meaning 14.6% from the population registered at the beginning of the nineties.

In Romania, the population's age structure has the characteristic fingerprint of a demographic ageing process due mainly to birth-rate decrease (by 8.8‰ in the year 2014), which triggered the absolute and relative diminishment of the young population (0-14 years of age). In parallel, the increased

life expectancy (72 years of age for men, and 78.91 years for women in the year 2014) [1] determined an increase in the numbers and weight of the elderly population (65 years of age and over).

For the first time in the last four decades, on 1 July 2006 the weight of the young population (with ages between 15-24 years) was equal to the weight of the elderly population (65 years of age and over) (14.5%).

Population ageing induces or even amplifies both the strictly demographic effects, and the ones of economic and social nature, from among which the following might be mentioned: deepening structural issues on the labour market, the financing of the public pensions' system, the increase in health expenditures and the issue of dependency, the continuing and increasing pressure on the state budget by the increased social assistance expenditures, and the impact on the savings' rate. An ageing population implies much higher costs regarding social expenditures.

In turn, Egypt is faced with a population boom in spite of the successes registered in diminishing the population growth rate, from 2.75% in the year 1986, to 1.92% in 2012, and to 1.6% in 2015. In this context, Egypt's population varied from 51.911 million inhabitants in 1990 to 86.132 million inhabitants in 2014.

This demographic explosion has as immediate effects: i) increase in the poverty rate (in the year 2015, 26.3% Egyptians lived under the poverty threshold); ii) increases in structural unemployment, mainly among young individuals (38.9%, in 2015); iii) increasing disparities between urban and rural areas.

In a country with habitable land and fresh water resources deficit, the population increase might have on medium- and long-term strong negative economic and social consequences.

However, it is known that population ageing implies also a string of difficulties related, first of all, to ensuring the financial stability of the pensions' insurance systems, to increased expenditures for health care, as well as to creating conditions for making good use of the potential of elderly.

The paper presents a brief analysis of economic and social implications of demographic ageing in Romania and of demographic changes in Egypt.

Economic and social implications of population's ageing in Romania
Romania, together with Slovakia, Poland, Latvia and Slovenia will know the swiftest population ageing rate in the following decades.

The first wave of the 'baby boom' generation is close to retirement and in the following years the dependency index (the relation between the numbers of the potentially active population and the number of children and elderly) will increase. The change in the demographic behaviour of the couples regarding their reproduction, the increase of mortality, the decrease in the birth-rate, as well as external migration had as consequence a diminishment in Romania's population by 3.2 million inhabitants in the last 26 years.

The age structure of the population bears the characteristic fingerprint of the demographic ageing process, mainly because of the decrease of the birth-rate, which triggered the absolute and relative decrease of the young population (0-14 years). The weight of the age group segment from 0 to 14 years of age fell from 23.7% in 1990, to 15% in 2015. The increase in life expectancy led to the increase of the weight of elderly population (65 years of age and over) from 10.3% in 1990 to 17.19 in the year 2015.

Romania already faces the complex economic and social consequences of a population in a slow, but continuing demographic ageing process. To this phenomenon has contributed both the economic and social crisis, and the fact that for the last century the industrialisation, urbanisation and modernisation have changed radically the values. From the extended family that provided to its members stability and safety, the shift was made to the family in which the independence of the members took first place. Most affected by this are the elderly, who found before their place inside the family and now are faced with isolation, abandon and institutionalisation.

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[1] TEMPO-online data-base, Romania's National Institute of Statistics, www.insse.ro

*A first **economic consequence** of ageing and of total population diminishment is the potential GDP decrease*, by reducing the contribution of the labour force and of the capital under the conditions of affecting thus domestic saving. Romania's potential GDP decreased to 2.1% in the year 2014[2], from 5% in the year 2004, as result of the constricting private investments.

The change in the age structure of the population triggers also structural changes of the latter. The increase in the near future in the numbers of the age group 50 to 64 years brings to the front the pressing issue of active ageing. This age segment triggers issues related to employment policies and to the reform of the pensions' system, to the creation of opportunities for extending the length of economic activities, thus contributing to diminishing the dependency ratio. The need of maintaining on the labour market an increased number of older workers presupposes a new approach of all issues related to the relation between age and labour market (continuing education and training, re-skilling, creating special jobs with flexible working time, etc.).

The demographic transition shall diminish, progressively, the availabilities of human resources on the labour market. In the year 2014, the average employment rate in Romania was of 61.0%, and 28.35% of the labour force was in agriculture, while 42% were identified in the services' sector.

Much less visible are the variations of supply on labour market and of the ratio between employed and unemployed population. During the last two decades also a rejuvenation of the labour force occurred due to the fact that on the labour market entered numerous generations born before 1989 with individuals having relatively high levels of education and training, advanced knowledge and who represent a valuable potential for the economic sector. However, this demographic dividend was not valorised accordingly. The low opportunities of employment within the national economy, according to personal preferences, the lack of jobs according to skills/competences, but also the lack of opportunities for obtaining adequate incomes for decent living determined many youths to emigrate.

If in the year 1990 there were 0.4 pensioners for each employee, the relationship changed in 1998, and currently for each employee there are 1.2 pensioners and, for the time horizon 2060 for each employee there will be 1.5 pensioners.

The change of the relationship between the cohort entering and the one exiting the labour market shall have significant consequences regarding labour force supply, productivity and labour force demand.

The demographic changes will exercise pressure also on the education system. The diminishment of the pupil/student cohorts shall trigger a diminishment of teaching staff supply on the labour market, a fact which on one hand shall make possible some budgetary resources savings but, on the other hand, will create a specialised staff void required for organising training and re-skilling courses during the entire active life in view of increasing the capacity of continuing the economic activity of elderly.

Another consequence is the increasing pressure on the state budget both with respect to incomes, thus affecting the economic growth and on the expenditures' side by increasing expenditures for social assistance and health.

The relationship between the number of "Romanian productive citizens, contributing to the public budget and the social funds" and the one of the beneficiaries of these funds decreases continuously together with the decrease in the numbers of those entering the labour market and the increase in the number of retired individuals.

An increase in the public expenditures for social protection above the current level might take place only under the conditions in which an increase of the weight of budgetary incomes in GDP takes place as well, as these are among the lowest from the European Union.

The demographic policy in the period 1967-1970 has as consequences an amplified pressure on the public health care and pension systems around the year 2035, which requires to reform in the shortest time possible the health care system by including private suppliers of medical services and maintaining the already implemented key reforms within the pension system.

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[2] *Mid-term forecast 2016-2020 – autumn variant 2016,* National Commission of Forecast (in Romanian) www.cnp.ro

Ageing and population decrease shall affect the domestic savings' rate and, implicitly, investments. At the same time with demographic ageing increases the weight of households with a low savings rate. The savings' possibilities of the elderly population diminish and, as result, the diminishment of Romania's capital dependency on external capital flows, while the domestic financing of economic growth becomes more marked.

The transition to older age groups is often accompanied by the decrease in the standard of living. The diminishment of economic possibilities and the worsening of the health condition make elderly more vulnerable regarding poverty. However, in Romania, the poverty or social exclusion risk (AROPE) for the age group 65 years of age and over had a descending trend for the last decade, as it reached 33.3% in 2015, and the severe material deprivation rate reached 21.5% slightly under the average value on country of 22.7%, but slightly higher than the value recorded for the age segment 18 to 64 years of age (21.2%).

The changes in the household and family structure related to the diminishment in the size of the first and to the disorganisation of the latter will have ***social consequences*** both at individual but also at society level. If before the issues of the elderly were solved inside the family, today and in the future the society will have to interfere increasingly more often in solving these issues. The exodus from village to town or abroad of young individuals, the industrialisation and urbanisation process, as well as the pension and health insurance systems led to placing some of the responsibilities for the elderly outside the family, thus changing the relationships between the generations.

The issue of the social consequences that are implied by population ageing represents a research field due to the multiple circumstances in which this population category finds itself, and at the same time displays various particularities. At the same time, the social consequences vary in relation to other aspects such as: economic, socio-cultural, psychological-social, and socio-medical ones. From among the social consequences of demographic ageing, we mention:

❖ *Disengagement and termination of the professional activity which triggers effects of social, family and individual nature*. The impact of such a moment is felt differently from individual to individual and presents particularities related to gender, social environment and professional training.

Women have a slightly easier transition in this respect as compared to men, which is explainable based on their various roles within the family and in the household. In turn, men are less involved in such activities and begin to see themselves as useless, displaying indisposition and sometimes dissatisfaction and apathy.

The studies realized by various experts highlight the fact that the shock of retirement is more intense among individuals with higher education and, in general, among skilled individuals, as compared with individuals with lower levels of education and training or even unskilled ones.

❖ *The feelings of uselessness and social isolation* which are related to the transition to pension and they are exacerbated in the case of elderly lacking occupation. At the same time, they are more obvious among men and among those in the urban area as compared with the rural area, and for individuals with precarious training against the group of skilled individuals, and in particular the individuals with higher education. These states have negative influence on the health status of the elderly favouring the manifestation of severe psychical illnesses, in particular the ones depression and anxiety.

❖ *Loneliness* is recorded especially among women who are more than men due to the gender imbalances in favour of women of old age, but also because of increased mortality rates among men.

❖ *The social relationships of elderly with individuals of their own generation, and with other age groups, especially with young individuals.* The loss of social relationships emphasise the feeling of loneliness, favour social isolation and the emergence of depressive states. Disregarding and marginalising elderly by the young generation has strong negative effects for their health. In this context, an important role play family, friends, relatives, acquaintances all being able to stimulate the upkeep of the social relationships of the elderly.

Economic and social implications of demographic evolutions in Egypt

With a surface of almost one million square kilometres, from among which almost 90% is desert and a population of 87.96 million inhabitants on 1 January 2015, Egypt is the most populated country of the Arab world and the second on the African continent.

Egypt is struggling to keep under control a population boom, a phenomenon which amplified during the last three years. By 60.9% of the population younger than 30 years of age on 1 January 2015, the population increase will continue to diminish already scarce resources and it might contribute to more marked social discontent.

In Egypt, the number of births increased by 45.44% between 2006 and 2015. The weight of the age segment 0-14 years reached 31.26% on January 2015, while the weight of those of 65 years of age and over was of 4.3%.

Egypt's population is focused in a narrow band along the Nile between the eastern and the western deserts and 57.3% of the population lived in the rural area and 42.7% in the urban areas in the year 2015.

One of the reasons leading to the explosion of the birth-rate growth boom is the change in the regulations regarding housing in the nineties which allowed young individuals to marry easier and, most probably, led to an increase in pregnancies and births..To this is added the abolishment of sexual education and awareness increasing programs regarding contraceptive methods as result of the 2011 uprising.

On the other hand, Egyptian women give birth, in average, to 3.5 children an average higher than the world average of 2.5 births per woman. Even if fertility in Egypt decreased from 5.3 births per woman in 1980 to 3.0 births in 2008, still the birth rate in 2014 of 3.5 births/women indicates that Egypt's demographic transition stagnated and the rapid population increase might be expected to continue. Egypt's population increase meant the increase in the numbers of women at reproductive age in the period 1980-2014 their numbers reaching 22 million. To this is added also the fact that in Egypt several families still marry their daughters at young ages which implies that in 2014 more than half a million of young girls with ages between 15 and 19 years of age were married. For these young girls, early marriage means, in general, giving birth early which is yet another driver of country's population growth.

The demographic changes of the last decades in Egypt have strong economic and social consequences.

The population increase worsened the situation on the labour market. Each year, more than 800000 young individuals enter the labour market, which is already affected by an unemployment rate of 13.4% in the second semester of the year 2013, and by the beginning of 2015. Young individuals who are mostly more educated than their parents are most affected by unemployment, over one-third (38.9%) from them being unemployed. Young women and men with higher education levels are also affected by unemployment in high shares. The gap between the unemployment rate for young women and men is very large: 35.5 pp (46.9% the unemployment rate for women and 11.4% for men, in 2014).

Almost one-third of Egypt's population is under the age of 15 years which means that in the following 15 years more than 27.5 million young individuals will reach the working age. This unprecedented number of young Egyptians ready to enter on the labour market might lead not only to increasing unemployment rates, but also to wages' diminishment with major implications both at national and family level.

A numerous school populations and the school enrolment rates on increase, in particular for girls are factors generating the insertion of teaching personnel in the labour market.

The demographic evolutions from Egypt have as consequence the increase of the poverty rate from 16.7% in 1999/2000 to 26.3% in 2012/2013 and to 27.8% in the year 2015 (Figure 1).

Poverty in Egypt displays regional disparities: while in the metropolitan areas (Cairo, Alexandria, Port Said and Suez) the poverty rate was of 15.7% while in the urban and rural areas from Lower Egypt was of 11.7%, respectively 17.4% in 2012/2013. In Upper Egypt, both in urban and rural areas the poverty rates are much higher than in Lower Egypt reaching 26.7%, and respectively 49.4% in 2012/2013. In general, rural areas have a higher poverty incidence than the urban ones from Egypt. In 2008/2009, the poverty rate in the urban area was of 11.0% while in the rural area the poverty rate was of 28.9%.

Figure 1 Poverty rates in Egypt, 1999-2013, (%)
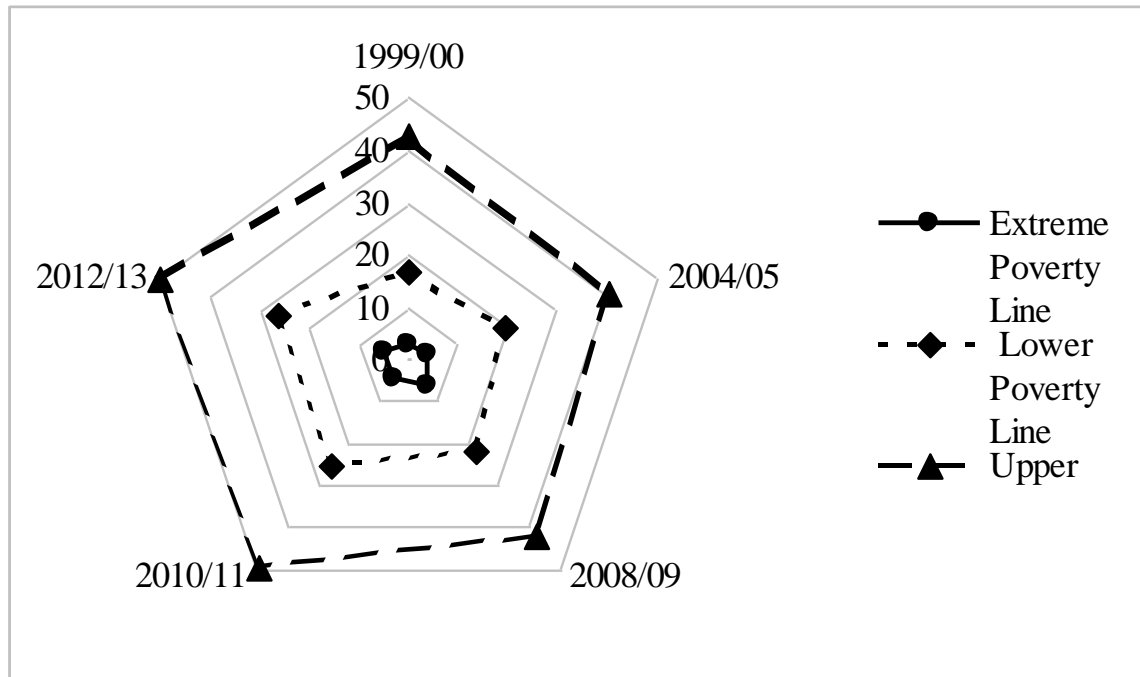
Source: Ichiki Tsuchiya, *Interim Report for Household Expenditure Patterns in Egypt during the 2000s*, IDE-JETRO, 2016, www.ide.go.jp

The demographic developments impacted also the health state of the population. According to the 2015 World Health Statistics regarding the health care facilities and health care personnel, Egypt has 0.6 basic health care units per 100000 inhabitants, 28 medical doctors and nurses to 10000 inhabitants for applying the various health care programs. The total health care expenditures represent about 5% from GDP. During the last years were registered a series of progresses in improving the health status of the population and in diminishing some communicable diseases (poliomyelitis diphtheria, tetanus, convulsive cough and tuberculosis). However, their effects were different depending on the fields and level of development of the regions in which they were implemented.

The population growth leads to increased public expenditures and pressure on the food and water resources, on the infrastructure and health care which facilities which are already limited.

Egypt's demographic realities and the associated economic and social implications generated lead to the requirement of cooperation between the authorities regulating the health and educational system and those regulating industry, housing, transportation, agriculture and many others.

Conclusions

The effects of the demographic ageing process of population for Romania or the ones of the demographic boom in Egypt on the development of the economic and social life, and on the future demographic evolutions will emerge in time triggering disturbances at the level of the school population, of the fertile age population, and of the working age population.

Romania underwent during the last decades significant changes in the population structure partly due to undergoing the demographic transition period, and partly because of the political changes which had a strong influence on the evolution of the demographic phenomena. The structure on age of Romania's population mirrors a slow but continuous process of demographic ageing, determined mainly by the decrease in the birth rate which led to the absolute and relative diminishment of the young population (0 – 14 years of age), and to the increase in the weight of the elderly population of 65 years of age and over.

The potential GDP decrease by diminishing the contribution of labour force and of capital, the increasing pressure on the state budget by increasing the social assistance expenditures and the slowdown of the savings' rate are the main economic consequences of population ageing.

The increase in the numbers of elderly has also social implications: shifts related to changing lifestyles, termination of working relationships, the changes suffered within family and within the social group of each person, the emergence of feelings of uselessness and social isolation. The changes occurred in family development where there are elderly persons create social issues both for the individual getting older, but also for the society.

The nature and amplitude of demographic developments in Egypt have strong economic and social implications: high unemployment, in particular among youths; lacking jobs as consequence of high and sudden labour force increase; the increase of public expenditures; the strong pressure on natural resources that cannot support a population with a high growth rate; the necessity of supplying basic services for an increasing number of Egyptian citizens: adequate housing, sanitation, medical assistance, education etc.; a high poverty rate; significant disparities between urban and rural areas, but also between regions, etc.

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DETERMINANTS OF HOUSEHOLD ELECTRICITY CONSUMPTION IN BAUCHI STATE, NIGERIA

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Abstract:

Electricity is one of the major aspects of a household's welfare. This study was conducted with the main aim of assessing the factors that influences the amount of household consumption of electricity in Bauchi state, Nigeria. About 750 households were selected using cluster area sampling out of which 539 responses were analyses. OLS regression model was estimated to examine the impact of the household's socio-economic and demographic characteristics on their electricity use and consumption.

The result indicates that level of education of the household head, living in the urban areas of Bauchi State, price of firewood and number of energy use devices at home, have positive significant impact on the household use of electricity. On the other hand, marital status was found to have a negative impact on the electricity expenditure, the households that are headed by a married person have less expenditure on electricity than otherwise.

The study recommends policies that ensure increase in the level of education and turning some rural areas into urban areas will encourage adoption and use of electricity as a main source of household energy thereby reducing the rate of using traditional biomass energy.

1. Introduction

Electricity is one of the major aspects of a household's welfare, availability of electricity supply at a cheaper price means raising standard of living for household members. It is one of the key determinants of economic development (Zaman et al., 2012). Electricity has attained a very important place in every household on this planet. It is a major contributor towards improvement of the standard of living of individuals and households (Tewathia, 2014). The household consumption of electricity in Bauchi State can be categorized into three major dimensions namely; cooking, lighting and cooling purposes.

Additionally, in modern times, electricity source of lighting is regarded as one of the most efficient and most widely source of lighting especially in high income countries. However, in Bauchi State where mostly electricity supply is unavailable and unreliable, and also its costs is sometimes unaffordable, the alternative sources of lighting in some cases are from semi-electric sources like battery torch lights and rechargeable lanterns.

The most widely source of lighting, especially in the rural areas of Bauchi State consists of traditional sources of lighting which appear in the form of fuel-based lighting sources like oil lamps, candles, firewood and kerosene lamps. Such wider use of traditional lighting sources also aggravates the problem of indoor air pollution which increases the risk of respiratory diseases. Similarly, the use of candles and kerosene lamps inside homes increases the danger of fire accidents. Moreover, such traditional lighting devices do not give sufficient lighting situations for reading and studying which limit the capacity of literacy and school performance. For instance, a typical traditional kerosene lamp delivers only a useful light of in between 1 – 6 lumens per meter square (lux), compared to the required standard of 300 lux for tasks such as reading (Mills, 2003). The wider use of both the firewood (for

cooking purposes) and the traditional sources of lighting are caused by many socio-economic characteristics of households in Bauchi State.

Factors like low income, low price of firewood and traditional lighting sources which made them easily affordable, low level of awareness on the dangers of the use of such type of energy, non availability and high price of electricity, as well as the culture of massive use of firewood in the environment encourage the adoption and use of firewood and the traditional sources of lighting. Therefore, it is very important to carry out an empirical study in order to provide up to date and relevant information on the households' electricity consumption pattern in Bauchi State, in order to improve their electricity consumption to the optimum level.

2. Literature Review

This section examines the various relevant previous studies conducted based on the variables estimated in this study.

Home Appliances: The number of energy consuming appliances at home, tends to increase the quantity of energy consumption by households. For instance, using OLS regression, Petersen (1982) investigated the determinants of variation in households' electricity usage. The variables that have significant positive impact on household electricity usage include; electric water heater, electric clothes dryer and dish washer. Similarly, a study to analyse the determinants of households' electricity use by Louw et al. (2008) found that ownership of iron has a significant positive impact in increasing the households' electricity use. However, Wang et al. (2011) concluded that subsidy for energy conservation appliance use encourages household electricity conservation behaviour. Moreover, Couture et al. (2012) concluded that households that possess wood burner and room heater have higher probability of adopting electricity as their main source of energy. Danlami et al. (2016) found that there is a negative relationship between home appliances and the adoption of electricity source of energy.

Price of Other Fuel: Various energy sources for household use are nearly close substitutes to one another, implying that the price of a particular household energy source influences the demand of other sources. A rise in the price of a particular energy source makes households to switch to the use of other fuels as established by previous studies (Lee, 2013; Mensah & Adu, 2013; Onoja, 2012). Moreover, Lee (2013) found that further rise in the price of firewood encourages households in both the urban and the rural areas to adopt non solid fuels. Similar argument was put forward by Mensah and Adu (2013) whereby the price of firewood was found to have positive influence on household fuel switching to electricity.

Marital Status: Laureti and Secondi (2012) indicates that households which comprise of couples with children tend to adopt more of coal-wood and less of electricity when compared with a household of a single person. On the contrary, a logit analysis by Danlami et al. (2016) found that there is a positive relationship between household head being male and the adoption of electricity source of cooking fuel. The household that is headed by a married individual has higher odd of adopting electricity fuel than otherwise.

Gender of the Household Head: Previous studies such as; Nlom and Karimove (2014), Jumbe and Angelsen (2010) and Osiolo (2010) proved no significant relationship between the gender of the household head and its energy consumption behaviour. However, Abebaw (2007) found that the household head being male encourages the consumption of fuel-wood. Furthermore, Mekonnen and Kohlin (2008) concluded that households with male head tend to adopt more non solid fuels than either solid or mixed solid and non solid. Moreover, Mensah and Adu (2013) found that household head being male discourages the household's adoption of cleaned energy. Similarly, a logit analysis by Danlami et al. (2016) indicated that there is negative relationship between a household head being male and the household adoption of electricity fuel source. A household that is headed by a female has higher odd of adopting electricity by about 3% compared to the male headed household.

Level of Education: Level of education of the household head has a positive relationship with the adoption of cleaned energy (like electricity). The higher educated is the household head, the more he realises the negative impact of un-cleaned energy and therefore the less it will be adopted. This assertion was found to be true by previous studies (Nlom & Karimove, 2014; Eakins, 2013; Mensah & Audu, 2013; Ozcan et al., 2013; Laureti & Secondi, 2012). Moreover, Lee (2013) concluded that level of education has a negative impact on the electricity consumption of households and that the higher the level of education of the household head, the higher the odd of adopting electricity source of energy instead of kerosene. Additionally, a multinomial logit analysis by Braun (2009) indicated that higher education of the household's head is associated with the adoption of more gas and less solid fuel and electricity. In the same vein, Laureti and Secondi (2012) concluded that the household that have a head who studied up to a degree level adopts more electricity and less LPG or coal-wood when compared with household where the head has diploma as the highest school level attended. Nlom and Karimove (2014) and Mensah and Adu (2013) found that the level of education of the household head encourages households switching to cleaner energy.

Household Size: The number of a household's members (i.e household size) affects the household's electricity consumption decision, the larger the size of a household, the lesser the cleaned energy to be adopted. This assertion was supported by previous studies (Ozcan et al., 2013; Mensah & Audu, 2013; Suliman, 2010; Heltberg, 2005). Onoja (2012) used two stages least square method to analyse factors influencing fuel-wood demand in Kogi state, Nigeria. The findings indicated that household size is positively related to the consumption of firewood. Lee (2013) found that household size have positive significant impact on the households' electricity consumption. Using the same OLS regression, Petersen (1982) concluded that family size, have significant positive impact on household electricity usage. The same conclusion was arrived at by Abrahamse and Steg (2009). Eakins (2013) established that number of adults in the home encourages households to adopt gas instead of electricity. Similarly, some studies (Abebaw, 2007; Jiangchao & Kotani, 2011; Song et al., 2012; Eakins, 2013) used Tobit model to analyse the impacts of households' sizes on their energy consumption. For instance, Jiangchao and Kotani (2011) analysed the determinants of households' use of electricity. The results indicated that the size of the household exacts a negative impact on households' consumption on electricity. Similarly, Braun (2009) indicated that as the number of households' members increases, the households increase the use of solid fuels and reduce the use of gas and electricity. Furthermore, higher education of the household's head is associated with the adoption of more gas and less electricity.

Location: The location of the home in which the households live have serious impact on their electricity consumption decision. The households that are located in urban areas tend to adopt cleaner energy (like electricity) than their rural counterparts. This was proved to be true by previous studies such as Eakins (2013), Ozcan et al. (2013) and Mensah and Audu (2013). For instance, Hosier and Dowd (1987) conducted an empirical test of energy ladder hypothesis in Zimbabwe. The results indicated that households living in urban area tend to use more electricity in relation to wood and kerosene. Suliman (2010) concluded that the location area in which household lives, exacts significant influence on their choice for cooking fuels. Households that live in urban areas adopt cleaner fuels than their rural counterpart. This is in line with the findings of Ozcan et al. (2013) whereby they concluded that households living in urban areas tend to adopt the modern energy sources (electricity) instead of firewood.

Home Size: The size of the residence in which households live influences their energy consumption behaviour. Similarly, Laureti and Secondi (2012) concluded that the larger the sizes of the home, the more households adopt oil and coal-wood and the less they adopt electricity. On the contrary, Tchereni (2013) found that there is a positive relationship between the home size and the adoption of electric source of energy. The higher the size of the home in which the household lives, the higher the

probability of adopting electricity. Additionally, Danlami et al. (2016) found that adoption of electric source of fuel is positively related to the size of home in which the household lives.

Number of Rooms: The number of rooms in the house is one of the building characteristics which influence households' energy consumption choice. For instance, Eakins (2013) indicated that number of rooms in the house is positively related to household expenditure on energy from electricity. Furthermore, a logit analysis by Eakins (2013) to estimate households' fuel adoption between gas and electricity in Irish established that number of rooms in the home encourages households to adopt gas instead of electricity. Louw et al. (2008) concluded that number of rooms has significant impact in increasing the households' electricity use. Meanwhile, Danlami et al. (2016) asserted that the higher the number of rooms, the higher the odd of adopting electric source of fuel.

Based on the above reviewed literature, it was found that there exist inconsistencies as per the findings and conclusions by the previous studies on household use of electricity. The inconsistencies indicate that the results and findings of one study from a particular area cannot be generalised to another area due to socio-economic, cultural and environmental differences. Therefore, studying determinants of household electricity consumption in a new area is an additional contribution to the existing literature.

3. Theoretical Framework

The background of the analysis of this study is anchored on the traditional theory of demand. The law of demand states that the higher the price of any commodity, the smaller the quantity of such commodity that is purchased and the lower the price, the higher the quantity demanded (Tawiah, 2000). Moreover, the price of other commodity plays a role in determining the quantity demand of another commodity depending on the relationship between the commodities.

However, it is not only price that influence the quantity of demand for a commodity but also there are non-price determinants of demand such as; income of the consumer, taste and preferences, number of consumers, and the availability of substitutes. In its implicit form, the relationship between the quantity demand of a commodity and factors affecting it is expressed as:

$$Qx = f\left(P_X, Y, P_S, P_C, T, N\right) \tag{1}$$

where:

Q_x = quantity demanded
P_X = price of good X
Y = income
P_S = price of substitute
P_C = price of complement
T = preferences
N = number of consumers

Applying demand theory to the analysis of household energy demand, previous studies (Lee, 2013; Couture et al., 2012; Song et al., 2012) established a relationship between some factors and the quantity of energy demand. For instance, the impacts of some factors like; gender of the household head, education, marital status, home ownership, household size, number of rooms and location on the quantity of household consumption of electricity can be analysed using multiple linear regression model.

$$Y_i = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + u_i \tag{2}$$

$i = 1, 2, \ldots, n$

Y_i = Quantity of electricity consumption
β_i = Coefficients
X_i = Various independent variables which can be in form of continuous or dummy

u_i = Unobserved error term

On *ceteris paribus* basis, other variables (determinants) can be held unchanged to observe the impact that a particular variable exacts on the quantity of electricity consumption.

4. Methodology

This section examines the approach adopted in the process of carrying out this study. It consists of the population of the study, sampling and sampling technique as well as the tool of data analysis used in the study.

4.1 Population of the Study

This study considers the households that live within the boundary of Bauchi State, Nigeria. The total estimated number of households as at 2014 was 769,960 (UNFPA, 2014). These households are spread in the three geopolitical zones of the State namely; Bauchi zone, Ningi zone and Katagum zone respectively.

4.2 Sample Size

After identifying the targeted population of this study, the next step followed was determining the sample size of this study. According to Bartlett, Kotrlik and Higgins (2001), sample size determination is common and usual task for many researchers, in that, it affects and influences the accuracy and quality of research. However, there is not specified percentage of the population set to be accurate for representation. What really matters is the number of the sample size and not a percentage of the study population (Jeff, 2001). Sekaran (2003) argued that when the sample size is too scarce, there will be prone of committing a type I error where the research rejects what should be accepted. On the other hand, too large sample size will lead to committing the type II error whereby the research accepts what should be rejected. Hence, neither too small nor too big sample size help in achieving accurate research conclusions. Roscoe (1975) give a rule of thumb for selecting a good sample size to be larger than 30 and less than 500 for most researches. And that in case of multivariate studies, the sample size should be at least 10 times as large as the number of variables. While, Bartlett et al. (2001) gave a rule of thumb for the accurate sample size of at least 5 to 10 times larger than the number of variables. According to Jeff (2001) the factors to be considered when choosing an appropriate sample size includes; the determined goals, the desired precision of findings, the confidence level, the degree of variability and the estimated response rate.

In this study, the total sample size used was determined based on Dillman (2011). According to Dillman (2011), the formula for determining a good representative sample is:

$$S = \frac{NP(1 - P)}{(\frac{B}{C})^2 (N - 1) + P(1 - P)} \tag{6}$$

where:

S= required sample size.

N= the population size (769,960)

P= the population proportion expected to answer in a particular way (the most conservative proportion is 0.50).

B= the degree of accuracy expressed as a proportion (0.05).

C= the Z statistic value based on the confidence level (in this case 1.96 is chosen for the 95% confidence level)

Therefore, the sample size can be determined as:

$$S = \frac{(769,960*0.5)(1-0.5)}{(0.05/1.96)^2(769,960-1)+(0.5)(1-0.5)} = \frac{192490}{501.067+0.25}$$

$$S = \frac{192490}{501.317} = 384$$

This determined sample size corresponds to what is contained in the sample size table by Dillman (2011) for 1,000,000,000 population size.

For the purpose of data collection for this study, a total of 750 questionnaires were distributed instead of the pre-determined sample number of 384 households. This was to avoid a problem of non response rate. Babbie (1995) argued that at least 50% rate of response is necessary for reporting and analysis (cited in Watson, 1998). Finally about 548 filled questionnaires were returned back, which is more than 70% of the total number of the issued questionnaires.

4.3 Sampling Technique

This study has adopted cluster area sampling method. According to Rao (2009), area sampling is a special type of cluster sampling whereby samples are grouped and clustered on the basis of geographical location areas. Area sampling is usually adopted where the research focuses on the population within a specific geographical area like country, state, county and city blocks (Valliant et al., 2013; Sekaran, 2003).

The reason for adopting this sampling method is that though the sampling frame for the various clusters of Bauchi State is available and was obtained from the National population commission office, there is no available frame containing the list of households living in Bauchi State. Hence in this situation, area sampling is one of the most suitable techniques of data collection. As argued by various scholars that the underlying practical motivation for using area sampling is the absence of complete and accurate list of the universal elements under study since it does not depend upon the population frame (Valliant et al., 2013; Rao, 2009; OECD, 2007; Sekaran, 2003).

The sampling technique used in this study is the multistage cluster sampling. In the first stage, the whole of the study area was divided in to three groups (clusters) based on the geo-political zonal categorisation of the State, the various categories are; Bauchi South, Bauchi Central and Bauchi North. In the second stage, two clusters (Bauchi South and Bauchi North) were selected randomly out of the three clusters. According to Saunders et al. (2009) and Kothari (2004), a researcher makes a random selection of some clusters to represent the total area under study.

In the third stage, these two clusters were further categorised into two sub clusters; urban and rural areas. Then a total of 10 wards were randomly selected from the urban areas while a total of 13 wards were selected randomly from the rural areas. This gives a total of 23 selected wards used as the sampling wards. In the fourth stage, six communities were selected randomly from each of the selected wards of urban areas which made a total of 60 communities from the urban areas. On the other hand, another six communities were randomly selected from the selected wards of the rural areas making a total of 78 communities used from the rural areas. This gives a total of 138 sampled communities used in the study.

In the last stage, six households were systematically selected from each of the selected communities of the urban areas making a total of 360 households selected from the urban areas. On the other hand, 5 households were selected systematically from each of the selected communities of the rural areas making a total of 390 households selected from the rural areas. Though finally, a total of 548 households participated in the study (i.e. the number of the returned questionnaires).

4.4 The Empirical Model

The main objective of this study is to assess the determinants of household electricity consumption. In this case, OLS regression model was employed to estimate the determinants of household consumption of electricity in Bauchi State. OLS model showing the relationship between dependent and independent variables can be expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k + U \tag{3}$$

The dependent variable Y and the independent variables (X_1, X_2, X_3 …, X_k) are perceptible irregular scalars, i.e. they can be observed in a random sample of the population. U is non observable

random error and β_0, β_1, β_2..., β_k are the various parameters to be estimated. However, it should be noted that estimation using OLS technique is guided by some assumptions which include: linearity of the parameters of the model, zero mean of the random error (i.e E(U)=0). Homoscedasticity of the variance of the error term (i.e. ε N iid(0, σ^2). Zero covariability or relationship between the random error and the explanatory variable (i.e cov(X_j, U))=0, absence of specification error in the estimated model and the absence of perfect multicollinearity among the independent variables.

Following Petersen (1982) and Lee (2013); the implicit form of the relationship between households' consumption of electricity and its determinants can be expressed as:

$$Y_i = \beta_0 + \sum_{i=0}^{k} \beta_i X_i \qquad (4)$$

where; Y_i is household i's consumption of electricity.

The empirical estimated OLS model for households' electricity consumption is shown explicitly as:

$$ELEC_i = \alpha_0 + \beta_1 HHGEND_i + \beta_2 MSTATUS_i + \beta_3 EDUHHH_i + \beta_4 HHSIZE_i$$
$$+ \beta_5 LOCATION_i + \beta_6 HSIZE_i + \beta_7 UPFW_i + \beta_8 NROOMS_i \qquad (5)$$
$$+ \beta_9 NLFUEL_i + \beta_{10} HAPP_i + \varepsilon_{ij}$$

where:
$ELEC_i$= household i, monthly expenditure on electricity
$HHGEND_i$= Gender of the head of household
MSTATUS= Marital status of the head of household
$HHEDU_i$= Level of education of the head of household
$HHSIZE_i$= Size of the household
$LOCATION_i$= Home location of the household
$HSIZE_i$= Home size
$NROOMS_i$= Number of rooms in the home of household
$UPFW_i$= Unit price of firewood per bundle
$NLFUEL_i$= Similarity with the neighbour's main fuel source
$NHAPP_i$= Number of home appliances own by household

5. Discussion of Results

This section provides the discussion of the result obtained from the estimated OLS regression model. However, the result of the variable correlation matrix is presented before discussion on the estimated OLS model.

5.1 Correlation Analysis

In this section, a correlation analysis was conducted in order to explore the nature of the correlation that exist among variables used in this study, and also to ascertain whether there are two or more variables that explain the same phenomena (i.e. multicollinearity of variables). Usually, the value of correlation coefficient ranges between 0 - 1. A correlation value of 0.7 indicates high correlation among variables. Furthermore, a negative value indicates negative relationship between variables and a positive value indicates positive relationship between variables. Table 1 exhibits the correlation values for variables in this study.

Table 1: Variable Correlation Matrix

	ELC	GEN	MST	EDU	HHS	LOC	HSZ	PFW	NRM	NLF	HPS
ELC	1.00										
GEN	-0.002	1.00									
MST	-0.09	0.18	1.00								
EDU	0.19	0.07	0.02	1.00							
HHS	-0.07	-0.01	-0.02	-0.09	1.00						
LOC	0.27	0.01	-0.02	0.30	-0.14	1.00					
HSZ	0.03	-0.04	0.09	0.12	0.26	0.05	1.00				
PFW	-0.05	-0.07	0.002	-0.13	0.01	-0.36	0.03	1.00			
NRM	-0.13	0.01	0.001	-0.05	0.38	-010	0.36	-0.02	1.00		
NLF	-0.06	0.02	0.05	-0.12	-0.15	-0.08	-003	0.07	-0.06	1.00	
HPS	0.13	0.01	0.07	0.03	0.06	0.06	0.16	-0.02	0.10	-0.06	1.00

5.2 Determinants of Electricity Consumption in Bauchi State

The main objective of this study is to estimate the determinants of electricity consumption in Bauchi State. In this section, the result obtained from the estimation of electricity consumption is presented and discussed. The result of the estimated OLS model for electricity consumption is presented in Table 2.

Table 2: Estimated OLS Model for Household Expenditure on Electricity

VARIABLES	OLS
gender	0.027
	(0.287)
marital status	-0.364*
	(0.187)
education	0.026**
	(0.010)
household size	-0.001
	(0.014)
location	0.591***
	(0.173)
home size	0.001
	(0.003)
price of firewood	0.003*
	(0.002)
lnnumber of rooms	-0.162
	(0.109)
Neighbour lighting fuel	-0.094
	(0.207)
home appliances	0.013**
	(0.007)
Constant	1.640***
	(0.394)
Observations	350
R^2	0.11

RAMSEY RESET TEST (SPECIFICATION TEST)
$F_{(3, 239)}$ = 1.96
Prob > F = 0.1197

Note: Robust standard errors in parentheses*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2 contains the result of the estimated OLS model for household electricity consumption in Bauchi State, Nigeria. The overall test statistic (F-value=9.86) of the model indicates that the estimated model is statistically significant at 0.1% (p-value = 0.000). Moreover, in order to further ascertain the validity of the model, various post estimation tests were conducted.

Test of Heteroskedasticity and Normality
The test of heteroskedasticity and normality were conducted using Cameron and Trivedi Im-test. The results of these tests are contained in Table 3:

Table 3: Cameron & Trivedi's Decomposition of IM-test

Source	X^2	df	P
Heteroskedasticity	52.05	61	0.7859
Skewness	13.73	10	0.1857
Kurtosis	2.27	1	0.1317
Total	68.05	72	0.6100

(Source: Author, 2016)

H_0: Homoscedasticity and normality.

The results of the heteroscedasticity and normality tests as shown in Table 3, failed to reject the null hypothesis of homoscedasticity and normality.

Test of Multicollinearity
Table 4 contains the VIF test for measuring the extent of multicollinearity among the independent variables.

Table 4: VIF Test of Multicollinearity

Variable	VIF	1/VIF
lnnumber of rooms	1.34	0.748
home size	1.32	0.757
location	1.31	0.763
household size	1.26	0.795
price of firewood	1.22	0.816
education	1.13	0.886
marital status	1.09	0.915
gender	1.08	0.924
home appliances	1.06	0.939
Nlfuel	1.05	0.948
Mean VIF	1.19	

(Source: Author, 2016)

Based on the result of the VIF test of variable multicollinearity shown in Table 4, since none of the VIF value reached a value of 10, there is no problem of multicollinearity among the included variables in the model and therefore, the study maintained all the variables for the purpose of estimation.

Specification Test
Here a test to see whether the estimated model is correctly specified or not. The specification test was conducted using Ramsey RESET test. The result of this test is shown in Table 2.

Based on the result of the model specification test, the null hypothesis that; the estimated model has no omitted variables was not rejected, and therefore, the model is correctly specified. The discussion of result and interpretation of variables estimated on the model of household electricity consumption are:

Marital Status: The result of the estimated OLS model in Table 2 has shown that this coefficient is statistically significant at 10% level. The result further shows that there is a negative relationship between this variable and the expenditure on electricity. The household that are headed by a married individual have less expenditure on electricity by about USD1.35 (₦365) lower compared to the household whereby the head is not married. This result does not conform to a priori expectation, because the expectation is that households that are headed by a married person have higher expenditure on electricity due to the fact that they are larger in size requiring higher expenditure on electricity than otherwise. However, the justification of this finding is that a married household head normally have more responsibilities on him than the single one, the condition which may make him to have lower budget on electricity consumption than the non married household head especially the fact that the people of the study area practice polygamy marriage system which makes them to have more responsibilities to shoulder leading to the cutting down of expenditure on electricity to other basic life necessities. This finding corresponds to the findings of Cayla et al. (2011).

Education: The result in Table 2 has shown that this coefficient is statistically significant at 5% level. Based on the estimated OLS result, an additional one year level of education attainment by the household head increases the household monthly expenditure on electricity by about USD0.09 (₦26) when other variables are held constant. This is tally with a priori expectation, because higher education level means higher income which results in increase in expenditure on electricity. Furthermore, the higher the level of education attained by the household head, the higher the minimum living standard to be maintained by the household leading to the rise in the household expenditure on electricity. This finding supports the findings of previous studies (Lee, 2013; Labandeira et al., 2010).

Location: The result in Table 2 has shown that this coefficient is statistically significant at 1% level. Based on the estimated result, households that are living in the urban areas have higher monthly expenditure on electricity than those living in the rural areas by about USD2.14 (₦600) when other factors are held constant. This conforms to a priori expectation because expenditure on electricity tends to be higher for urban dwellers than for rural dwellers due to so many reasons. Firstly availability, the number of hours in which electricity is available in urban areas is higher than that of rural areas which make the expenditure on electricity in the urban areas higher. Secondly, the electrical appliances own and use by households living in the urban areas far outweigh that of those living in rural areas which result in higher expenditure in the urban areas than the rural areas. Lastly, affordability, the households living in urban areas mostly have more income than those living in the rural areas and therefore afford to pay more on electricity consumption than those living in the rural areas. This finding corresponds to the earlier findings of previous studies (Eakins, 2013; Labandeira et al., 2010; Diabi, 1998).

Price of Firewood: The result from the estimated model in Table 2 has shown that this coefficient is statistically significant at 10% level. The result has shown that there is a positive relationship between the household expenditure on electricity and the price of firewood. Based on the estimated coefficient; a USD0.04 (₦10) increase in the price of firewood bundle leads to increase in the household expenditure on electricity by about USD0.11 (₦30) when other factors are held constant. This is tally with a priori expectation because in most cases especially for cooking purposes, firewood and electricity are close substitute hence as the price of firewood rises, households switch to the consumption of electricity by increasing their expenditure on the electricity. This is tally with the findings of Svoboda

and Br (2013) and also in line with the argument of the theory of demand, that the price of a commodity has a positive relationship with the amount of quantity demand of the other close substitute good, so that as the price rises, people substitutes to the consumption and use of the other commodity or service.

Home Appliances: This variable represents the number of home electrical appliances such as bulbs, fluorescents, televisions, radio, refrigerators etc, possess at home measured in terms of number of unit quantity. Based on the estimated result, this variable was found to be statistically significant at 5% level. The result has shown that an addition to the stock of electrical appliance use at home, brings about increase in household expenditure on electricity by about USD0.05 (₦13) when other factors are held constant. This is in line with a priori expectation, because the higher the number of electrical device owned, the higher the consumption of electricity, consequently the higher the expenditure on electricity. This finding is tally with the findings of some previous studies (Eakins, 2013; Louw et al., 2008; Petersen, 1982)

6. Conclusions and Recommendations

This study was conducted with the main aim of examining the factors that influence household electricity consumption in Bauchi State, Nigeria. OLS regression model was used to achieve the stated objective. The dependent variable is the average monthly expenditure on electricity for the household. The study found that the higher the level of education of the household head, the higher the level of expenditure on electricity. Similarly, households that are living in the urban areas of Bauchi State have more expenditure on electricity than those living in the rural areas.

Price of firewood was found to have a positive significant relationship with the electricity consumption. Similarly, the study found that the higher the number of energy use devices at home, the higher the amount of electricity expenditure.

Contrarily, marital status was found to have a negative impact on the electricity expenditure, the households that are headed by a married person have less expenditure on electricity than otherwise.

However, the variables that were found to have insignificant relationship with the household expenditure on electricity are; gender, household size, number of rooms and home size. Therefore, the study recommends policies that ensure increase in the level of education and turning some rural areas into urban areas will encourage adoption and use of electricity as a main source of household energy thereby reducing the rate of using traditional biomass energy.

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THE CORRELATION BETWEEN VALUE ADDED TAX AND ECONOMIC GROWTH IN ROMANIA

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Abstract:
The study aims to investigate the relationship between the revenues collected from the VAT and the GDP in Romania, for the period of 1993-2016. The interest in studying this relationship derives from the importance gained by this tax over the years and from the actuality of the economic growth in Romania. The methods used are: estimating a regression model and estimating the autoregressive vector model using Eviews 9. The regression model has the gross domestic as a dependent variable and as an independent variable the revenues from the VAT. The results obtained from the analysis indicates that there is a positive and direct relationship between the two variables and the variation of the GDP is explained by the revenues from the VAT.

Key words: VAT, economic growth, autoregressive vector, Granger causality

JEL classification: H20, C50

Introduction

The VAT is an indirect tax which has the objective of "delivering goods to third parties and for their own consumption, purchases of goods, services, imported goods"[3]. The importance of this tax is due to the fact that it is applied to most of the sale or purchase operations of goods and services and is also a tax introduced in both European Union and non-EU countries. The history of this tax began in France in 1954. It was invented by Maurice Lauré.

The VAT has become over time a major source of income for the country where it was introduced due to its way of application ("application of the tax rate: a) on the value added at each stage of the goods from the producer to the buyer; b) either on the sales price from that stage, thus obtaining the sales tax, which deducts the tax on the sale price from the previous stage")[4] and, at the same time, due to the scope.

In our country, the VAT was introduced in 1993. Until then it was preceded by the tax on the movement of goods. The standard quota was initially 18%. The maximum quota used in our country was 24%, and it was introduced in 2010, as a fiscal measure generated by the economic crisis in Romania. In 2016 the standard quota becomes 20%. Being a consumption tax, it has a direct relationship with the level of tax revenue and the growth rate.

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[4] Vacarel I., 2006, "Public Finance", 5th edition , Bucharest, Didactic and Pedagogical Publishing House, p.417

Literature review

Studies on the impact of fiscal policy on the economic growth of a state have been made over time and it's still a topical issue. The fiscal policy can be applied in different forms. The impact of budgetary expenditure and budgetary revenues, the impact of consumption taxes and income taxes, or the impact of other taxes on economic growth has been analyzed over the years in different countries.

Alberto Alesina and Roberto Perotti performed an analysis of 20 OECD countries for the period 1960-1994 in terms of tax adjustments applied. They consider that household taxes and social security contributions have the greatest impact on unit labor costs. They study the effects of reducing the transfers and government salaries while household taxes are maintained or reduced.

William Easterly and Sergio Rabelo (1993), using historical data and recent cross-sections, highlights the relationship between fiscal policy variables, development level, and the growth rate. They conclude that there is a relationship between the level of development and the tax structure, so that income taxes have a bigger impact only in the economically developed countries, while the poor countries are based heavily on international trade taxes.

Iulian Viorel Braşoveanu (2009) in "Analysis of fiscal policy in Romania and EU Member States" studies the evolution of the main taxes in our country, the Romanian fiscality and the fiscality of EU states. The author highlights the changes which took place over the years and their importance in the economic development of the country. He mentions that the optimal fiscal pressure is the one that allows maximization of economic growth and that the fiscal systems represent the concrete manifestation of a state's fiscal policy, overall an essential coordinate of the national policies. Funded in accordance with the realities of economic and social life, a country's fiscal strategies can ensure its well-being and progress. Otherwise, they can cause stagnation or regression of the economy, can create social tensions.[5]

Aderati, S. A., Sanni, M. R, and Adesina, J. A (2011) have conducted a study regarding the VAT and the economic growth in Nigeria. Using as a base variable the revenues from the VAT and the GDP they have conducted an econometric study for the period between 1994 and 2008. Among the conclusions of this study, there is also the fact that between the revenues collected from VAT and the GDP there is a positive correlation. According to this study, any measures taken regarding the VAT or GDP become efficient in at least two years.

Ezeji E. Chigbu and Peter Ifeanyichukwu Ali (2014) conducted an econometric analysis of the impact of the VAT on economic growth in Nigeria. Using the Granger co-integration technique for data from 1994 to 2012, they demonstrate that VAT has a positive effect on the economic growth. The two consider that the state should be involved in increasing the contribution of the VAT to the economic growth.

Lawrence Kimuhu Njogu (2015) studying the effects of the value-added tax on economic growth in Kenya for the period 1990-2014 found that there was a negative relationship between VAT rates and economic growth. He believes that the state should reduce the VAT rate or maintain it at low levels to increase the country's gross domestic product.

Dasalegn Mosissa Jalata (2014) conducts a study on the role of the VAT in Ethiopia's economic growth. Using data between 2003 and 2012, it builds an econometric model in which the GDP is the dependent variable and the VAT, the total tax revenue, the non-tax revenue, and foreign earnings are

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[5] Brasoveanu I. V., 2009, Analysis of fiscal policy in Romania and EU Member States, Bucharest, ASE Publishing House,

independent variables. The results of the regression show that all independent variables, except the foreign incomes, reach the significance level of 5%, but all the four dependent variables contribute to economic growth.

Farzana Lalarukh and Mohammad Salahuddin Chowdhury (2013) using data from 1991 to 2012 study the contribution of the VAT to GDP for Bangladesh. Using the Johansen co-integration technique they demonstrate that the VAT has a positive impact on both the gross domestic product and the economic growth of this country. The authors of the study believe that the VAT could be used by the state as an efficient instrument for generating revenues, given its positive impact on economic growth.

Gustavo Canavire-Bacarreza, Jorge Martinez-Vazquez and Violeta Vulovic (2013) in the study "Taxation and Growth in Latin America" analyze the impact of the most important taxes on economic growth in countries such as Argentina, Brazil, Mexico and Chile, using the autoregressive vector. The tax instruments studied are personal income tax, income tax, general taxes on goods and services, other sales taxes and income from natural resources. One of the study's conclusions is that VAT can have significant positive effects on economic growth in the studied countries, by increasing the dependence on this tax.

There are also studies proving a negative relationship between fiscal policy instruments and economic growth.

Rogoff K. and Carmen Reinhart made a study on the impact of public debt on growth rates and on the inflation. The findings of the study are that the high levels of public debt resulted from the recent financial crisis will inhibit global growth.

Roberto Perotti (2005), studying the effects of fiscal policy on GDP, inflation and interest rates in five OECD member countries, highlights that fiscal policy has little influence on GDP, government spending and tax cuts on GDP has become weaker over time.

Alberto Alesina and Silvia Ardagna are studying fiscal stimulus and fiscal adjustment in OECD member countries between 1970 and 2007. Fiscal stimulus based on tax cuts are more efficient in delivering economic growth than those based on higher spending. Fiscal stability based on higher spending is more difficult to achieve because spending can grow faster than tax revenue.

Methodology of research

Starting from the studies mentioned above and from the previous research, I have proposed in this paper to highlight the relationship between the GDP and the VAT in Romania. Data sources for this study were the National Institute of Statistics and the Ministry of Public Finance. Next, I will estimate a linear regression model that will have the GDP as a dependent variable, and as an independent variable the earnings from the VAT. At the same time, to highlight the relationship between the two variables I also used the autoregressive vector (VAR) method.

The data used are annual, expressed in millions of RON, between 1993 (the year in which value added tax was introduced in Romania) and 2016. The notations used are GDP for Gross Domestic Product and VAT for Value Added Tax. Estimation of the regression model and autoregressive vector model is done using the Eviews 9 program.

1. Regression model description

The unifactorial econometric model is of the form: $y = f(x) + \mu$, where y (the dependent variable) represents the gross domestic product for our country during the studied period, x (the independent variable) is the value-added tax and μ is the residual variable and denotes the influence of the other incidental factors and with a minor impact on the factor y. Thus, the econometric model is: $GDP = \alpha 0 + \alpha 1 VAT + \mu$.

To achieve the results of the estimated model, I have completed several stages: establishing the null hypothesis, studying the data series, the graphical representation of data, descriptive statistics of the two sets of data, testing the correlation of data series, data processing, estimation model, interpretation of results.

The null hypothesis from which the econometric model has started is that VAT receipts do not affect GDP.
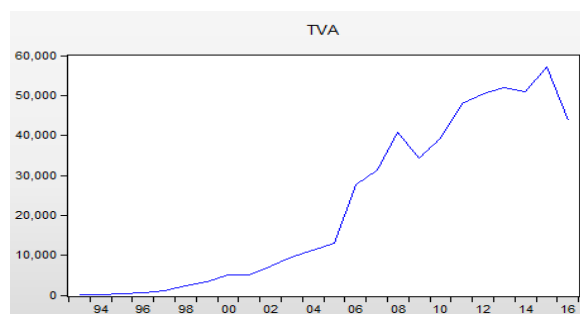
Before applying the econometric model, I analyzed the data by studying their evolution over the years. In the figures below are graphically represented evolutions of the two variables from 1993 to 2016.

Figure no. 1. The evolution of GDP during the period of 1993-2016
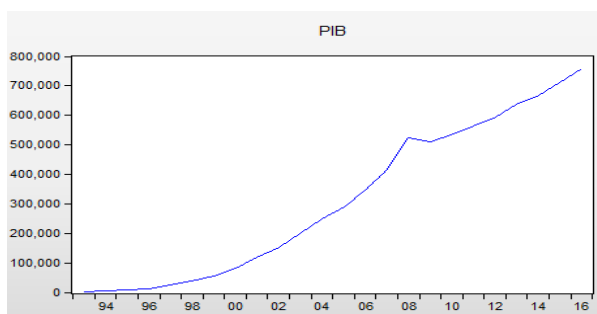
Figure no. 2. Evolution of VAT during the period of 1993-2016
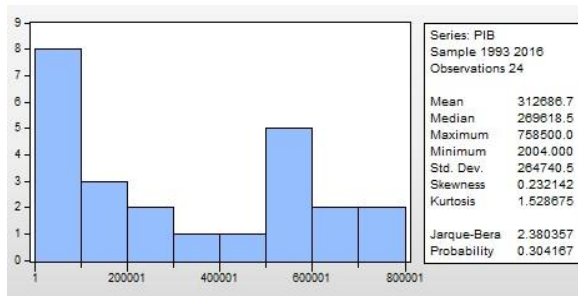

Source: own processing using Eviews 9

Source: own processing using Eviews 9

It can be seen from the graphical representation that the two data series had an ascending trend. Unlike VAT earnings that have suffered several variations, the GDP only decreased in 2008 from 524389 million RON to 510,523 million RON in 2009, and in the following years continued to grow. The VAT earnings decreased from one year to the next in 2009 compared to 2008, 2014 versus 2013 and 2016 versus 2015. In 2016, as compared to 2015, the decrease in the revenues collected can be explained by reducing the standard tax rate to 20%.

Before applying the econometric model, I analyzed the data by studying their evolution over the years. In the figures below are graphically represented evolutions of the two variables from 1993 to 2016. The descriptive statistics of the two series of data is illustrated below:

Figure no. 3. Descriptive statistics series of GDP data

Figure no. 4. Descriptive statistics series of VAT data
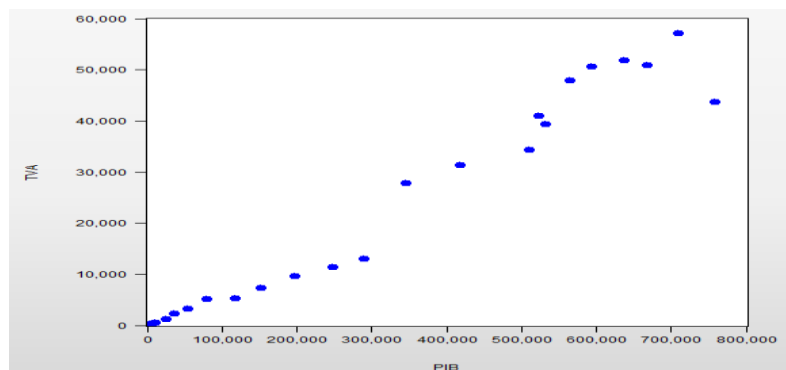

Source: own processing using Eviews 9
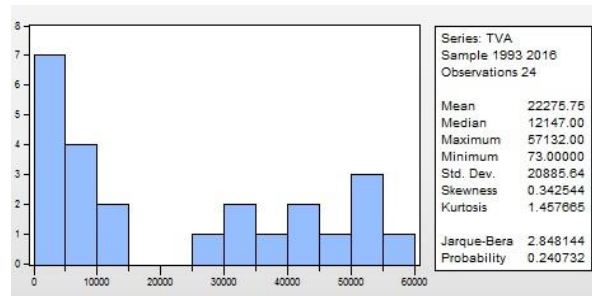
Source: own processing using Eviews 9

As shown in the previous figure for the GDP data series, the average is 312686.7 million RON, the minimum of the series is in 2004 and the maximum 758500 million RON. The probability associated with the Jarque Bera test is 0.304167, inferior to the chosen level of relevance (5%), which means that the null hypothesis is rejected, that the GDP data series isn't normally distributed.

For the VAT series, the average is 22275.75 million RON, the minimum value of the series is 73 million RON and the maximum 57132 million RON. The probability associated with the Jarque Bera test is 0.240732. This value indicates that neither the VAT data series is normally distributed.

To highlight the relationship between the two data series, I checked the correlation both graphically and by applying the Pearson correlation coefficient. From the graphical representation below, it is shown that there is a direct relationship between the two variables.

Figure no. 5. Graphical representation of the link between GDP and VAT

Source: own processing using Eviews 9

The Pearson correlation coefficient indicates that the link between the two variables is very strong. This correlation coefficient is 0.977525, higher than 0.75, which confirms the good association of the two variables.

I processed the data by logarithmic the regression equation, helping to interpret regression coefficients. The regression equation becomes:

$\log GDP = \log \alpha_0 + \log \alpha_1 (VAT) + \mu$

To estimate the regression model I used the least squares method, obtaining the following results:

Figure no. 6. The results of the regression model parameter estimation

Dependent Variable: L_PIB
Method: Least Squares
Date: 01/15/17   Time: 20:18
Sample: 1993 2016
Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.766106	0.163053	23.09749	0.0000
L_TVA	0.895256	0.017723	50.51423	0.0000

R-squared	0.991452	Mean dependent var		11.81958
Adjusted R-squared	0.991063	S.D. dependent var		1.771327
S.E. of regression	0.167450	Akaike info criterion		-0.656611
Sum squared resid	0.616868	Schwarz criterion		-0.558440
Log likelihood	9.879332	Hannan-Quinn criter.		-0.630566
F-statistic	2551.688	Durbin-Watson stat		0.990549
Prob(F-statistic)	0.000000			

Source: own processing using Eviews 9

According to the previous figure, the equation of regression becomes:

log GDP = 3,766106 + 0,895256 log VAT + μ

Thus, the results of the regression model demonstrate that there is a positive relationship between VAT and GDP, rejecting the null hypothesis that VAT does not influence GDP. The positive coefficient of the VAT term indicates that there is a direct relationship between the two variables.

The R-squared coefficient is 0.991452, which means that 99% of the GDP variation is explained by the VAT revenues. Both the R-squared coefficient and the Adjusted R-squared coefficient (0.991063) indicate that the pattern is correct.

Durbin-Watson's coefficient measures the correlation of residues. Seeing that the value of this test is 0.99, being inferior to 2, it indicates that model errors are positively correlated.

Given the parameter estimation results of the regression model, used to establish the correlation between GDP and VAT, it can be stated that the econometric model is a valid one and there is a strong relationship between the two variables.

2. Description of autoregressive vector model

To confirm the results obtained by estimating the regression model, I will further develop the autoregressive vector model. The first step is testing the data series stationarity using the Augmented Dickey-Fuller test and the Phillips-Perron test.

The results of the Augmented Dickey-Fuller test for the two series are as follows:

Figure no. 7. ADF test for VAT series

Null Hypothesis: TVA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.628716	0.8455
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Figure no. 8. ADF Test for GDP Series

Null Hypothesis: PIB has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.573994	0.9990
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Figure no. 7. and no. 8., contain the results of the ADF test, the critical values for the 1%, 5% and 10% relevance levels, and the probability associated with the test. For VAT, the ADF test is 0.628716 and for GDP 1.573994. If the test result is higher than the critical value, then the series is non-stationary (the series has a single root). From the results of the ADF test for the two series of data, both the GDP series and the VAT series are nonstationary.

At the same time, the stationarity of the data series can be tested using the Phillips-Perron test.

The results of this test can be found in the following figures:

Figure no. 9. The Phillips-Perron Test for the VAT series

Null Hypothesis: TVA has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.589366	0.8548
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Source: own processing using Eviews 9

Figure no. 10. Phillips-Perron Test for PIB Series

Null Hypothesis: PIB has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		1.250479	0.9974
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Source: own processing using Eviews 9

The Phillips-Perron test confirms the results of the ADF test, the two series are nonstationary.

This accepts the null hypothesis, which assumes that the series contains a unit root. The nonstationary data series transforms into stationary data series by applying differences.

The results of testing the stationarity of the 1st difference data series are as follows:

Figure no. 11. ADF test for the 1st order differentiated VAT series

Null Hypothesis: D(TVA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.552160	0.0017
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

Source: own processing using Eviews 9

Figure no. 12. ADF test for the 1st order differentiated GDP series

Null Hypothesis: D(PIB) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.291281	0.0279
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

Source: own processing using Eviews 9

As it results from the application of the ADF test for the two series of data of the 1st difference, the GDP data series does not become stationary by applying the 1st difference. As a result, we test the stationarity of the 2nd difference GDP series and obtain the following results:

Figure no. 13. ADF test for the 2nd order differentiated GDP series

Null Hypothesis: D(PIB,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.950742	0.0000
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

Source: own processing using Eviews 9

Following the ADF test results, it can be stated that the VAT data series becomes stationary by applying the 1st difference, whereas the GDP data series becomes stationary only if the 2nd difference is applied.

Before estimating the autoregressive vector model, I tested the causality between the two variables using the Pairwise Granger test, to establish whether there is a relationship between the two variables. The results of the Pairwise Granger test are as follows:

Figure no. 14. The Pairwise Granger causality test

Pairwise Granger Causality Tests
Date: 03/08/17   Time: 00:02
Sample: 1993 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
PIB does not Granger Cause TVA	22	2.66347	0.0986
TVA does not Granger Cause PIB		0.94279	0.4090

Source: own processing using Eviews 9

For a probability of less than 0.05, the null hypothesis is rejected. Given that the probability returned for the null hypothesis "VAT does not cause Granger PIB" is 0.4090 it results that the variation of VAT influences GDP.

The final step in this section is the estimation of the autoregressive vector model. The results are as follows:

Figure no. 15. Estimation of the Unrestricted Autoregressive GDP-VAT Vector

```
Vector Autoregression Estimates
Date: 03/08/17   Time: 00:43
Sample (adjusted): 1997 2016
Included observations: 20 after adjustments
Standard errors in ( ) & t-statistics in [ ]
```

	D(PIB)	D(TVA)
D(PIB(-1))	0.615226	0.036916
	(0.26520)	(0.09280)
	[2.31985]	[0.39782]
D(PIB(-2))	-0.464529	-0.087193
	(0.22751)	(0.07961)
	[-2.04181]	[-1.09529]
D(PIB(-3))	0.824463	0.151919
	(0.20841)	(0.07292)
	[3.95604]	[2.08328]
D(TVA(-1))	-1.171469	-0.456344
	(1.32995)	(0.46536)
	[-0.88084]	[-0.98063]
D(TVA(-2))	3.194702	0.504976
	(1.25920)	(0.44060)
	[2.53709]	[1.14610]
D(TVA(-3))	-5.626179	-0.678390
	(1.38633)	(0.48509)
	[-4.05833]	[-1.39849]
C	14712.83	695.2298
	(8193.82)	(2867.08)
	[1.79560]	[0.24249]
R-squared	0.695172	0.320875

Source: own processing using Eviews 9

The results of the estimation of the autoregressive vector model confirm the results obtained by estimating the regression model parameters. Between the two variables, there is a direct relationship, that means VAT can influence GDP.

Conclusions

In accordance with previous studies, the main conclusion of this paper is that VAT is the most important indirect tax for both the Romanian state and the other countries that have adopted this tax.

According to the studies mentioned in the "Literature review" section, in countries such as Nigeria, Kenya, Ethiopia, Bangladesh, Argentina, Brazil, Mexico and Chile, there is a positive relationship between VAT and GDP. Empirical studies conducted for various periods, indicate that this tax contributes significantly to the economic growth of those countries.

There are also studies showing that there is a negative relationship between some fiscal policy instruments and economic growth. Regarding VAT, Lawrence Kimuhu Njogu, in 2015, demonstrates that there is a negative relationship between VAT rates and economic growth in Kenya, considering that the increase of VAT rates does not result in economic growth and that the state should reduce or to maintain the VAT rates.

In the last part of the study, using a regression model of the form GDP = f (VAT) + μ, I have processed in the Eviews 9 program data from our country from 1993 to 2016. Both the results of previous regression model estimates and those of this econometric model, indicate a strong relationship and a positive correlation between VAT revenues and GDP.

The estimated autoregressive vector model also indicates the positive relationship between VAT and GDP.

The VAT is a powerful fiscal instrument, which, correctly used and efficiently collected, can significantly improve the growth of both a developed country and a developing country.

It is not enough for this tax to be on the list of a state taxes. It is much more important to be collected correctly and efficiently. This task comes first for taxpayers and then for the state in which the tax is adopted.

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EVOLUTIVE PERSPECTIVES OF ECONOMIC ENTITIES THROUGH THE DEVELOPMENT OF ADVANCED MANAGERIAL ACCOUNTING SYSTEM

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Abstract:

The scientific research highlights the necessity of developing a managerial accounting system based on target-costing method. Thus, this model is intended as a catalyst for the metallurgical industry environment heavily affected by fluctuations in the current economic environment. Simultaneously, the research purpose represents the opportunity of awareness that in order to increase the performances of economic entities from metallurgical industry needs to refine managerial accounting by implementing an advanced managerial accounting system.

Key words: *managerial accounting, target costing, competitive economy, metallurgical industry, advanced managerial accounting system*

Jel classification*: M64*

Introduction

Competitive economy has a significant impact on the decisions of economic entities, the main feature of any competitive economy being the autonomy of decision. Economic decisions taken by economic entities producing goods, works and services revolve generally around a so-called "central institution" which is the market, who ultimately validates their decisions. Based on the principles of rationality and effectiveness, the producers and consumers selects from variants of decisions the privileged ones (Horga, Bratu, 2003). Except the syncope generated by global economic crisis, we ascertain from the experience of countries with developed market economy and those that are in transition towards such economy that the advantages offered by a competitive market economy are relevant and with more powerful impact on the socio-economic system than disadvantages that occur unhindered. This fact leads to maintain balance of economic activities.

Among these advantages we must note the following (Giard, 2003): conditioned by the size of profit, individual producers or economic entity is encouraged to take the free decision to produce the amount considered to be necessary, the technical conditions specified for certain categories of beneficiaries and with all the consequences on the effectiveness of the resources used and complexity; competition and prices become decisive for the levers in respect of the cost and efficiency of resource used; competition determines economic entities to open to technological progress, to the default towards innovation; all producers seek to maximize profits, hence the need to determine the structure of production, works and services, and better income distribution; production system, works and services does not exclude the existence of budget constraints generating bankruptcy and new conditions of production and business reorganization; democratic state should be involved only with regard to generating properties, applying regulations and consumer protection

Given the presentation of competitive economy in the current geostrategic and economic context in which Romania is part, we can affirm that the country needs a revival of industry, especially the metallurgical industry, that is subject of our scientific research and for whom we want to validate optimal alternatives for a profitable reindustrialization. By highlighting the importance of revitalizing the metallurgical industry in Romania, we want this research to open new horizons for achieving improvements managerial accounting organization and production, in order to achieve significant performance and also to relocate Romania in the first exporters of steel products with optimal ratio "quality- price". Having carried out a nationwide awareness of the need to revitalize the industry, especially metallurgical industry, it appears particularly the need to reorganize and rethink, both technically, technologically and from terms of accounting economic entities that operate or will operate in this industry. Thus, we emphasize the central objective of scientific research, namely: "The need to rethinking and reorganization the managerial accounting system of economic entities operating in the metallurgical industry through vision provided by Target costing method".

Literature Review

The research context regarding metallurgical industry presents European Union as the second great producer of steel in the world, with a production over 177 million tons of steel per year, representing 11% of global production (Sinteza_consultări_ME, 2013). It is known that the European metallurgical sector is now in a very difficult situation. The current economic crisis has led to a significant decrease of production and the associated demand for steel, which remains 27% below pre-crisis level. As a result, several production units have closed or have reduced their production leading to job cuts, therefore in the last years the sector had lost up to 40 000 jobs. The European metallurgical industry is confronting with simultaneous effects of reduced demands and overcapacity on a market of globalized steel, as well as with high energy prices. This industry must invest on order to adapt to ecological economy and also to manufacture innovative products. The Romanian research context presents the metallurgical industry as being privatised at a rate of 100% and the foreign capital being about 80%. In Romania, the metallurgical industry represents an important sector for national economy because this is multiplier for: gross value added, industrial production, jobs, taxes, etc. In the last years it also made about 2% of EU steel production and contributed to the country's macroeconomics indicators (about 8% of industrial output, 11% of exports, 22,500 employees).

Although the main metallurgical companies have been restructured in terms of technological, financial and social spheres, the international economic and financial situation (he fall in the construction market in the entire space of the European Union, the increase in energy tariffs, the increase in raw material prices, devaluation of national currency, etc.) it has directly affected the economic and financial results of the companies working in this field, leading to negative profit/loss accounts. In such context, the development of modern methods of sizing and calculation of costs has become an objective necessity in the efforts of economic entities to obtain competitive advantage. Large companies, mostly from economically advanced countries have built and adopt their own strategies and also new methods of organizing production and cost analysis. Those directly linked to increased turnover and profit, reduced manufacturing cycles and costs, led other economic entities to follow this trend (Dumitru, Ioaneş, 2005).

Major technological and organizational mutations occurred in the last two decades in particular have disrupted production. The development of supply and demand, technologies and competition induces a particular problem in production, regarding the objectives and strategies and also are related with the organizational options. Therefore we emphasize that traditional methods of accounting management in the new global economic context offered by technological and organizational changes,

not always provide the best means for the organization and functioning of an efficient organization and management of production.

Essentially, the continued use of traditional methods of accounting management under the impact of inertia is becoming more and more an obstacle for the progress, approach aimed: organization of production management through workflows, productive approach named just-in-time; organizing cycle "design - manufacturing - distribution" by integrating all the necessary stages in a transversal approach, process; the integration in the process of production of all the external parameters on economic and performance consideration, ensures a more better flexibility in time, space and better efficiency (Diaconu et al, 2003).

The main reasons that marks the limits of using traditional management methods are as follows (Ionaşcu, Filip, Stere, 2002*): i) the use of traditional management methods allows to know the costs on different functions of the enterprise, in reality practical needs are oriented towards determining the costs of different components of the decision-making chain; ii) most costs are determined on the stage of production, respectively predefined time periods; iii) traditional methods of management are focused on the analysis and on cost control established in the execution stages; iv) traditional management methods usually provide information which is regularly used to establish the sales prices*. In the context of increased international competition, companies are forced to maintain their market position, in other words to adjust production according with the new requirements. Simultaneously, it is necessary to calculate and analyse the cost of the various components both upstream and downstream of the product designed and launched; *v) Traditional methods of management are using formulas for distribution of indirect costs which often lead to underestimation or overestimation of costs, distorting product costs and also affecting the actual costs of economic entities, with significant impact on decision-making; vi) generally the cost analysis highlights post-calculation without provisional strategic deviations.* Numerous research undertaken in the light of the new optical, finding methods of cost calculation adapted to the actual informational needs, in the new context of production organization, led us to "target costing" method. This method aims a new management directed toward the market, with great reactivity in customer satisfaction.

Determining costs by using Target-costing method allows prompt and effective organizing management and offers rapid and relevant information necessary for operational management. Target costing method is a cost management tool that reduces the total cost of a product throughout its life cycle, through the integration of a close link between production departments, research - development, marketing, accounting and quality (see Ansari, Bell, 1997). It orients the economic entity towards the market, ensure a dynamic management of costs from the stage of conception by developing a strategic link between company departments and its external factors, creating a relationship of self-control, cooperation and motivation of all staff (Diaconu et al, 2003). Such method fails to outline a management system accounting which requires an evolution of the economic entity, since the adoption and ongoing upgrade production technologies, development of managerial accounting and orientation and proximity to the economic entity of reality, necessity and availability of purchase customers (Dumitru, Ioanăş, 2005). The effects of using and applying the target costing method are the increasing of cost competitiveness and the stabilization of quality (see Rains, 2011). Since this method is customer-oriented, it requires that the company that applies it to meet customer expectations by developing reliable and durable products. Another effect of the application of the method is the software development and product design much shorter, because the effort is more intense for design and product development.

The unit of measure of success for companies that have implemented target costing method is the profitability. All decisions in environmental -a target costing has impact on profit. To be successful economic entity needs to know customer needs, the amount you are willing to pay in order to meet the

need, the volume of product that they are willing to purchase. It should also be well known competing products, functions, features and cost. Finally, after corroborating this information, we can plan and make the product achieve the objectives of quality, cost and speed in design in accordance with market requirements (Robinson, 1999). Convinced that the "Target costing" method is an opportunity and a favourable context for the development of an advanced accountancy management system which can be successfully applied in metallurgy industry, and can generate both regenerate the industry and reposition their main engines of growth and development in the national economy. *Simultaneously, in this scientific approach we launched the hypothesis „It is necessary to become aware that in order to increase performances in an economic entity of the metallurgical industry it takes an optimization in manufacturing accounting", hypothesis that will be tested by using questionnaire.*

2. Research Methodology

Among the data collection methods used in the scientific research by the management sciences, the survey is extremely common. All the more, the survey based on a questionnaire has the advantage of interrogating the people depending on the needs, in a qualitative or quantitative manner. Evidently, the survey method simplifies quite a lot the procedure of the research carried out. During the first, qualitative stage, the exploration of the object under analysis takes place, and then during the second, quantitative stage, it becomes possible to confirm the hypotheses formulated even since the exploratory stage. (Niculescu, Vasile, 2011). An advantage of the use of the method of the survey based on a questionnaire is the fact that, from case to case, the two stages can take place simultaneously, alternatively, or the qualitative stage can follow the quantitative stage to ponder on the results obtained.

The use of a survey based on a questionnaire supposes great attention especially concerning the sample and the interaction between the survey-maker and the respondents. In our case, having determined to use the survey based on a questionnaire, initially our concerns referred to the drafting and optimization of the questionnaire, then we paid attention to the administration of the questionnaire from which we were expecting reliable and valid results. Regarding the drafting and construction of the questionnaire, there are no clear procedures certainly leading to the best questionnaire. Depending on the existing needs and the recommendations made, we have reached the conclusion that we would draft a questionnaire with 14 questions, based on scores and addressed to a sample of 300 people coming from 3 work groups, depending on the size of the economic entities in the area of South Muntenia The features recorded for the study undertaken on the occasion of the research are three, namely: tuition domain (economic, juridical, technical, socio-humanities, other), the position held in the economic entity (accountant, economist, head of financial-accounting office, head of financial-accounting service, financial-accounting director) and ancientness in this position (under 1 year, 1 – 3 years, 3 – 5 years, 5 – 10 years, over 10 years).

3. Results

Regarding the questionnaire used as a working method, responses were received through direct questionnaires through courier services or using email. Our intention, at the beginning of this approach, was to complete 300 questionnaires, yet after the centralization of the answers received, we reached a number of 258 questionnaires (an answer ratio of 86.00%). Out of these 258 questionnaires, we noticed that 33 were not filled in adequately or not all the answers were filled in, so we excluded them, which left us with a final number of 225 questionnaires, which led to an answer ratio of 75.00%, a ratio which we consider representative for the sample created. For the interpretation of the answers to the

questionnaire drafted for this case study we used the SPSS (Statistical Package for the Social Sciences) program.

The variables describing the attributes of the sample present the following average values: for the variable tuition domain – 1.40, for the variable position – 2.32, and for the variable ancientness – 3.68. The standard variations of these variables have the following values: tuition domain - .687, position 1.155, and ancientness – 1.345. The next 11 questions of the questionnaire on management accounting organization and optimization in the manufacturing sector of the metallurgical industry concerned the method of calculation of the manufacturing costs, the advantages provided by the calculation methods, the weight of the products' costs in the total of the expenses, the approach of the Target Costing Method for the optimization of the manufacturing management accounting, the qualitative instrument used in order to collect the data for the "Target Costing" approach, the realization of the market studies in the "Target Costing" approach, the conditions for the determination of the product's target cost, the strategic and operational forecast in the implementation of the Target Costing Method, the analysis plans for the new products, the need to implement a derived optimization model for manufacturing accounting in the economic entities of the metallurgical industry and the need to know the increase in performances of an economic entity of the metallurgical industry as a consequence of the optimization of its manufacturing accounting through the implementation of the Target Costing Method and the limitations recorded.

Our survey respondents were asked to choose the method of calculation used in the entities from which they originate (overall orders, on stages, direct-direct costing, cost, standard cost, ABC, marginal cost, target costing, or some other method). The top three methods of calculation of costs used in the economic entities of those 225 respondents are presented as follows: method on phase-40% method commands-24,5%, i.e. a global method-15.6%. The hierarchy of these advantages is the following: the low costs are the main advantage offered by the calculation method (35.6%), followed by simplicity (24.0%), promptness (10.2%), efficiency (9.8%), efficacy (8.0%), usefulness (6.7%), and viability (5.8%). (See Figure 1.)

Figure 1. Variable Correlation method vs. advantage of the method
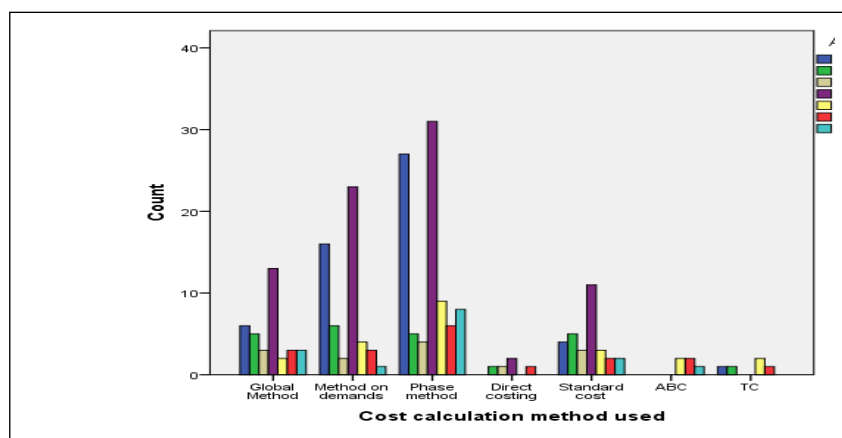
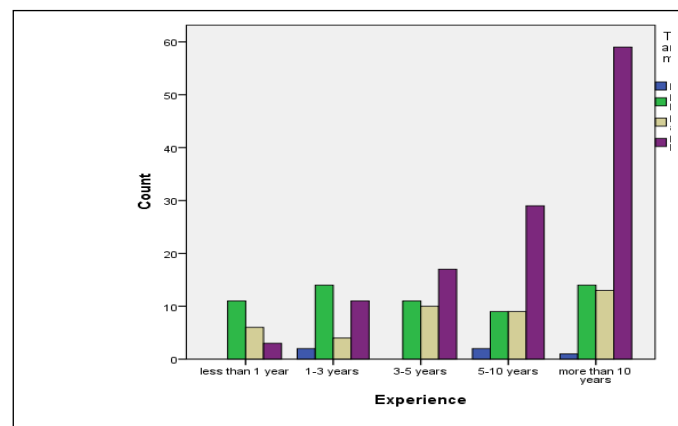
((*Source: processed by the author)*

Next, we wanted to know the respondents' opinion the impact of the use of the Target Costing Method on the optimization of the manufacturing management accounting and implicitly on the increase of the performances in the economic entities from which the 225 respondents come. This impact is great and very great one according to the vision of about 80% of the interviewees. We consider this as something normal, the main reason of the adoption of the Target Costing Method being the projection of the products' costs before their introduction in manufacturing, consequently avoiding the introduction

in the manufacturing stage of those products whose profit margin is low. Only 12 respondents out of the total of 225 consider this approach as one with a very low impact on the increase in performances for the economic entities the respondents come from.

As a sequel to the previous question, the respondents had to choose the most significant and performing instrument with a view to collecting data for the "Target Costing" approach. The questionnaire was the instrument mentioned the most often in the answers received, over 110 respondents, corresponding to a percentage of 49.8% of interviewees agreeing with this thing. The next instrument in the respondents' options was a combination between the individual interview and the group interview (11.6%), then the forecast techniques were nominated as an important working tool by 17.3% of the respondents, whereas 12.0% of the total of the respondents consider the individual interview as being important.

The profit awaited by the economic entity is the main element considered when setting the target cost of the new product. This is the perspective of 37.8% of the total of 225 respondents. Another important element is the analyses for a global managerial approach of the project – 30.2%, while the clients' desires are appreciated as being important in the determination of the target cost only by 21.3% of all the respondents. The respondents of the study drafted on the occasion of our scientific approach were kindly asked to express their perspective on the need and opportunities of the implementation of a derived model of optimization for manufacturing accounting in the economic entities of the metallurgical industry.

Figure 2. The need to implement an accounting model production processing derivative using the crosstab evaluation from the experience vision
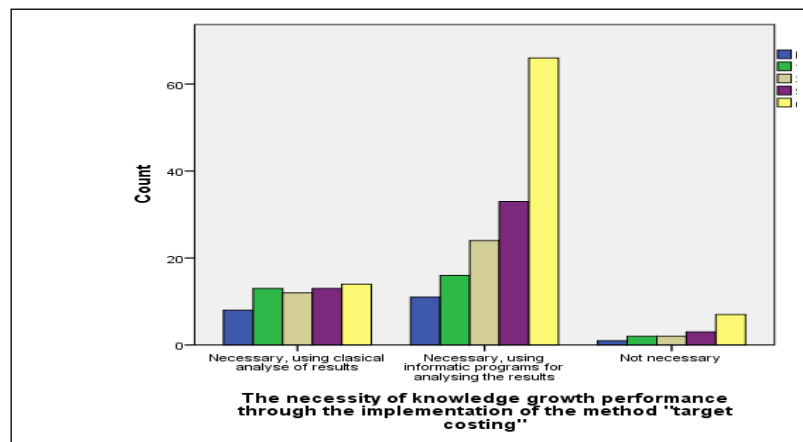

(Source: processed by the author)

Over half of them (119 respondents corresponding to a percentage of 52.89%) appreciate that the implementation of such a model is necessary only if the limitations and advantages of the respective model are known in advance, which denotes a certain trace of prudence, which is normal from our perspective. It should be mentioned that an extremely small percentage (2.2%) of all the respondents do not consider it necessary or opportune to implement such a derived model (Figure 2.).

The last question of the questionnaire drafted in order to study management accounting organization and optimization in the manufacturing sector of the metallurgical industry concerned the way the 225 respondents consider that the performances the economic entities they are coming from can be increased, by the implementation of the Target Costing Method (See Table 2 and Figure 3.)

Figure 3. The need of knowledge growth performance through the implementation of the method "target costing" using crosstab evaluation from position held

(Source: processed by the author)

Since we are living in the knowledge society and the role of the new information and communication technologies is growing more and more, over 65% of the respondents consider that these performances can be improved using in the analysis of the results specialized IT programs.

4. Conclusions

The performances of the economic entities are directly influenced by the modification of the costs. If they maintain a consistent cost control, the entities of the metallurgical industry have the possibility to track and analyze, at the same time, the activity they develop and will be able to identify, under these circumstances, various ways of reducing their costs or increasing their performances. Analyzing the way management accounting accomplishes its role and attributes for which it was conceived, offering support in the decisional process, on the level of the entities of the metallurgical industry in our country, we identified the following situation: on the one hand, the interest of these entities for the organization of their management accounting in order to use the data for different analyses is low, and, on the other hand, even where it is organized, it is rather the traditional calculation methods that are mostly applied. One of the methods applied is the global method, which develops a traditional conception regarding the processing of the indirect expenses, the latter being assimilated to the direct expenses, without insisting on a rigorous manner of attributing them on the calculation objects. For this reason, the cost calculation and analysis need to be realized in agreement with the company's strategic horizon: the life duration of a product, the stages of realization of certain technological innovations, the strategic stages of equipment renewal etc. The results obtained following the application of the method of the survey based on a questionnaire for the use of the quantitative methods in the approach of extending the Target Costing Method in the metallurgical industry clearly highlight the need to use this method. This means that the first operational objective of the present scientific research has been attained and the first hypothesis of the scientific research has been confirmed, namely, "*It is necessary to become aware that in order to increase performances in an economic entity of the metallurgical industry it takes an optimization in manufacturing accounting*"

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