Business Administration and Business Economics

Factors Affecting Internet Banking Usage in India: An Empirical Analysis

Shariq Mohammed[1]

Abstract: This study aims at identifying the factors affecting the customers demand for Internet banking usage by analyzing sample of 450 consumers' responses who have been interviewed personally through structured survey in 3 districts of Uttar Pradesh India. The study was conducted on the private, public and foreign banks which included ICICI Bank Ltd., HDFC Bank Ltd. and AXIS Bank, Standard Chartered Bank and Yes Bank. Among public sector banks the respondents were from Bank of Baroda, Punjab National Bank and State Bank of India and Canara Bank. The sample size of 450 has been taken from among the urban population of above 18 years of age. The result indicates that the educated respondents use the service of internet banking. Based on occupation we can say that the service class and the business class is the one who use internet banking service to nearly 2 times as other occupation. The high income respondents having more than 1 lack income prefer to use this service. The private sector bank account holders use this service as compared to public sector banks. The banking attributes i.e. convenience and security do have very attentive influence on the use of Internet banking.

Keywords: Internet banking usage; regression analysis; logit model; technology and innovation; consumer usage; customer's satisfaction

JEL Classification: G10

1. Introduction

After the implementation of liberalization, privatization and Globalization (LPG) policy there were number of new developments which were implemented in the banking sector. In 1991 then the government brought the privatization in the banking sector. Banking in India has witnessed remarkable changes and development since the onset of the processes of liberalization, privatization and Globalization (LPG). The challenges ahead for banks have greatly increased with increasing competition and the growing demands for a variety and superior quality of banking services. The customer's orientation of the banking sector has significantly increased in recent times. The introduction of variety of new products and services with emphasis on quality of services clearly indicates how banks

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address the issues of customer's needs and requirements through a customer's – centric approach. The private banks are posing a very stiff competition to the public sector banks through their initiatives for meeting customer's expectation and gaining a cutting edge. Now the public sector banks are responding to the challenges posed by the private sector banks through conscious efforts to enhance their services quality.

In the post–LPG (Liberalization, Privatization and Globalization) era and information technology (IT) era, transformation in Indian banks is taking place with different parameters and the contours of banking services are dynamically altering the face of banking, as banks are stepping towards e-banking from traditional banking. Banking sector is undergoing a rapid transformation with the use of technology. These banks are able to leverage on low cost channels such as ATMs and net banking to the optimum levels contributing to reduced operating costs. The different e-channels such as ATMs, credit and debit cards, Telebanking, Mobile–banking, phone banking, and online banking are changing the face of the Indian banks.

Internet banking means, on-line banking from home or anywhere. It provides "anywhere, anytime" banking access to one's account as well as to the public information updated by the bank on its website. It has been introduced in India by most commercial banks which have fully computerized their operations. Just as the bank staff accesses the account of a customer on-line, the customer can also access his/her account on-line *via* internet.

For using internet banking the customer requires a personal computer, a telephone link, and a modem along with a internet provider and then he can use this facility of the bank.

In internet banking, the customer himself accesses his account through the internet connected to the bank's data base. The account details are displayed on the PC screen and can be browsed by him.

I. In the first type of internet banking the customers are allowed only viewing facility, in this the customer cannot transfer funds;

II. The second type of internet facility is by which the customer can transfer money from one of his accounts to another and even to a third party's account, albeit, within the authorized limits. Here the RTGS facility is taken into consideration.

Technology was seen as a key business enabler in six vital areas of banking viz. augmenting profit pool, operational efficiency, customer management, distribution and reach, product innovation and efficient payment and settlement (Shastri, 2004).

Innovations in the field of banking, information and telecommunication technologies have drastically changed the structure of the overall financial system and particularly banking system by lowering the transaction costs and reducing asymmetric information (Katri et.al, 2002).

In recent years, the application of information technology has been magnificently increased in the service industries, particularly in the banking industry, which by using information technology related products such as online banking, electronic payments, security investments, information exchanges, financial organizations can deliver high quality services to clients with less efforts (Berger, 2003).

A total of 8 per cent of the sites offers "advanced transactions" such as online funds transfer, transactions and cash management' services. Foreign banks in India like Citibank, ANZ Grindlays Bank, Standard Chartered Bank, HSBC, Bank of America, Deutsche Bank and ABN Amro Bank; and local private banks like ICICI Bank, UTI Bank, HDFC Bank, Global Trust Bank, IndusInd Bank and IDBI Bank are leaders in offering advanced online banking facilities to the Indian customers. ICICI Connect, a leader in providing online banking services, has more than one million customers banking through their computers. This is one-sixth of the total customer base of ICICI Bank. Also, their number of online customers has doubled in six months, which is also true for other banks such as HSBC, HDFC, Citibank, lDBI, ABN Amro, GTB and UTI (Sinha, 2002).

Sharma and Mehta (2004) made a comparative study of quality perceptions on four banks in India State bank of India, Corporation bank (both government owned banks), UTI Bank (NPSB) and J & K Bank (OPSB) using SERVQUAL model. The result indicated that there is a difference in the service quality perception of customers in the public sector and private sector banks. On tangibility dimensions, UTI Bank topped the list followed by Corporation bank, SBI and J&K Bank. Public Sector Undertaking Banks were ranked better compared to private sector banks on reliability. On the dimensions of responsiveness (employees' capability to respond to customers) the ranking was Corporation bank leading the list followed by UTI, SBI and J&K Bank. On empathy dimensions (Bank's understanding of customer needs) Corporation bank lead the ranking followed by UTI, SBI and J&K Bank. PSU Banks were found to be ahead of private sector bank on assurance dimension of service quality.

Kaynak and Harcar, (2005) observed that in recent years, commercial banks of all types and sizes have intensified the use of online banking in their operations. First offered in mid-1990s, online banking is becoming the latest breakthrough development in the ever·growing world financial services marketing.

There is a multitude of retail banking service available for consumers but their classification and total number vary across different sources. In a broad context,

Howcroft et al. (2002) have classified the financial services into the following four groups:

1) Current account;
2) Insurance-based;
3) Credit-based;
4) Investment-based services.

In relation to online banking, Chou and Chou (2000) have listed some five basic services:

1) Viewing account balances and transaction histories;
2) Paying bills;
3) Transferring funds between accounts;
4) Requesting credit card advances;
5) Ordering cheques.

One of the major forces behind these developments is technology, which is breaching geographical, industrial, and regulatory barriers, creating new products, services, market opportunities, and developing more information and systems-oriented business and management processes Liao and Cheung, (2002).

AC Nielsen (2002) found that Internet banking is expanding in many Asian countries, including South Korea, Hong Kong, Singapore, China, and Taiwan. Thai banks have followed worldwide trends in implementing self-service technology via the Internet, although as a still developing country, Thailand is slightly behind the more developed Asian countries. ACNielsen (2002), Internet banking provides opportunities for the bank to develop its market by attracting a new customer base from existing Internet users (Suganthi et al., 2001; Dannenberg & Kellner, 1998; Zineldin, 1995).

Pooja Malhotra and Balwinder Singh (2007), made an exploratory study is to attempt to discover the factors affecting a bank's decision to adopt Internet banking in India. Particularly, it seeks to examine the relationship between the bank's adoption decision and various bank and market characteristics. The data for this study consist of panel data of 88 banks in India covering the financial years 1997-1998 to 2004-2005.

Siriluck Rotchanakltumnuai & Mark Speece (2003) Many Thai banks are currently implementing Internet banking. Banks that offer service via this channel claim that it reduces costs and makes them more competitive. In-depth qualitative interviews with Thai firms suggest that security of the Internet is a major factor inhibiting wider adoption. Those already using Internet banking seem to have more

confidence that the system is reliable, whereas non-users are much more service conscious and do not trust financial transactions made via Internet channels. Non Internet banking users tend to have more negative management attitudes toward adoption and are more likely to claim lack of resources. Legal support is also a major barrier to Internet banking adoption for corporate customers.

2. Objectives and Hypothesis

Here we had taken a hypothesis that all the customers are equally satisfied with the use of all kinds of e-banking services. The study also aims to identify Socio – Demographic factors (Gender, Education, Occupation, Income, and Metro Status) which influence uses of advanced IT based banking services/ Innovative Banking Services**, i.e** Internet Banking. It also studies the Banking attribute (bank type, account type, convenient accessibility, number of services offered, and cost of services) are associated with the use of advanced IT based banking services/ Innovative Banking Services i.e Internet Banking .

Following hypothesis have been tested based on customers responses:

H1: Demographic profiles of consumers have a significant impact on usage of innovative Banking.

H1a: Demographic profiles (Gender, Education, Occupation, Income, and Metro Status.) have a significant impact on the use of Internet Banking.

H2: Banking attributes have a significant impact of use of innovative Banking.

H2a: Banking attribute (bank type, account type, convenient accessibility, number of services offered, and cost of services) significantly influence the use of advanced IT based banking services/ Innovative Banking Services like Internet Banking.

2.1. The Basic Model Has Been Defined as Follows:

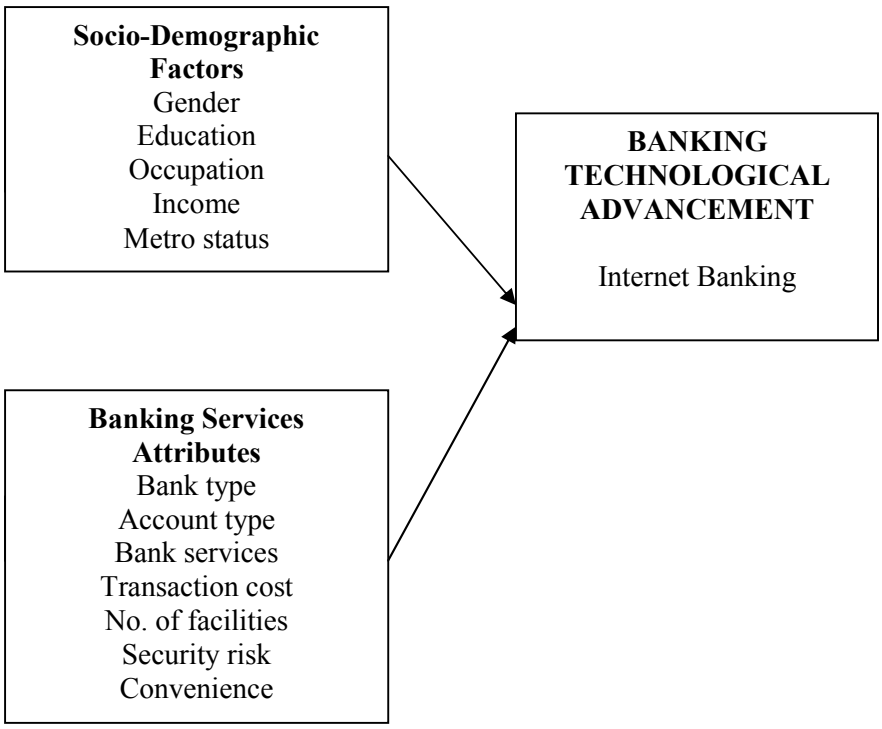

Figure 1. Basic Model

Source: Made by the Author

2.2. Data and Methodology

2.2.1 Survey Data

This study is based on a survey carried out through a structured questionnaire. The primary data required for the study has been collected from three cities of Uttar Pradesh, India across different regions so as to make it representative of entire population. Sample size of 450 has been taken from among the urban population of over 18 years of age from Lucknow, Kanpur, and Varanasi. Questions related to use of ATM Services were asked, usage pattern, problems faced during usage etc were asked. Similarly, the questions related to socio-demographic information of the respondents such as gender, education level, occupation and household income were also included.

2.2.2 Consumers' Profile Analysis

Table 1 presents socio-demographic of the banks' consumer respondents. The socio demographic profile of overall sample is shown in Table 1. The sample comprises of 81 percent male and 19 percent female respondents. Educational profile of the sample shows that about 89 percent respondents are graduate and above; 11 percent are having education up to secondary and higher secondary levels. About 55 percent respondents have an annual income of Rupees 300,000 & above, and 45 percent have an annual income less than Rupees 300,000. The 87 percent of the respondents had a saving account and 13 percent had current accounts. 74 percent of the respondents had an account in a public sector bank, 22 percent of the respondents had a private sector bank account. And 4 percent had an account in foreign bank.

Table 1. Sample Demographic Characteristics

	N	%		N	%
Gender			**Annual Income**		
Male	364	80.9	less than 1,00,000	54	12.0
Female	86	19.1	1,00,001 To 2,00,000	36	8.0
Occupation			2,00,001 To 3,00,000	114	25.3
Government service	103	22.9	3,00,001 To 4,00,000	114	25.3
Private service	65	14.4	More than 4,00,001	132	29.3
Business	177	39.3	**Types Of Accounts**		
others	105	23.3	Saving	393	87.3
Education			Current	57	12.7
High School	13	2.9	**Category of Banks**		
Intermediate	37	8.2	Private Bank	98	21.8
Graduation	248	55.1	Public Bank	335	74.4
Post Graduation	152	33.8	Foreign Bank	17	3.8

3. Data Analysis

An empirical model has been developed to identify the factors affecting the customers demand for banking services. The customers' Socio-Demographics factors (mainly gender, education, occupation income level and metro status) and the banking attribute (bank type, account type, convenient accessibility, number of services offered, and cost of services) were considered as a independent variable whereas use of advanced IT based banking services/ Innovative Banking Services**,** **(**Internet Banking,) was considered as dependent variables. The logistic binary regression analysis was performed using SPSS 16.0 software.

To conduct regression analysis, the banking services were treated as dependent variables while Socio-Demographics factors of the customers and the banking

attributes were used as independent variables. The descriptions of both dependent and independent variables are given in the Table 2 as follows.

Table 2. Dependent and Independent Variables

Code	DESCRIPTION OF VARIABLES
	DEPENDENT VARIABLES
Internet banking	(1-If use of Internet banking services, 0-otherwise)
	INDEPENDENT VARIABLES
GEN	(1-if male, 0-otherwise)
EDUC	(1-if PG, 0-otherwise)
OCCUP	(1-if service, 0-otherwise)
INCOM	(1-if >Rs. 100000 annual, 0-otherwise)
METRO STATUS	(0-if Metro status, 1-otherwise)
BANK TYPE	(1-if public sector, 0-otherwise)
ACCOUNT TYPE	(1-if saving account, 0-otherwise)
BANK SERVICES	(1-Yes, 0-otherwise)
TRANSACTION COST	(1-least, 0-otherwise)
SECURITY RISK	(1-Yes, 0-otherwise)
CONV	(1-if convenient accessibility of services, 0-otherwise)
SERVICE	(1-if offered maximum number of services, 0-otherwise)
COST	(1-if least cost services, 0-otherwise)

The regression analysis resulted - coefficients β and effect-coefficients Exp(β). The estimated β coefficients are measures of the changes in odds[1] ratio. A positive coefficient sign indicates increases the probability of customer responses to use the particular banking service and a negative sign not to use it. The degree of impact of the independent variables is reported by so-called effect-coefficients Exp (β) which indicate the change of the odds ratio when the independent value increases for one unit. We used the Nagelkerke R^2 to assess the goodness of fit of the model and the Wald test to estimate the significance of the influence of the independents.

All the variables were evaluated in accordance to logit model developed as follows:

Equation 1

$$Log\ \lambda_i = \alpha + \beta_1 GEN + \beta_2 EDUC + \beta_3 OCCUP + \beta_4 INCOM + \beta_5 METROSTATU\ S + \beta_6 BANK + \beta_7 ACCNT + \beta_8 CONV + \beta_9 SERVIC + \beta_{10} COST + \varepsilon_i$$

All the variables (dependent & independent) used in the model were dichotomized into binary (0, 1) formats according to description. The logit model is based on the cumulative logistic probability function and is specified as:

Equation 2

$$P = F(Z) = \frac{1}{(1 + e^{-(\alpha + \beta_i X_i)})}$$

where *Z* determines a set of explanatory variables *X*; *F(Z)* is the cumulative logistic function; *e* represents the base of natural logarithms and *P* is the probability of success when explanatory variable has the value *X*. Logit models are interpreted using Odds and Odds ratios. The odds ratio indicates the multiplicative impact in the odds for a unitary change in the explanatory variable holding other variables as constant. If the exponentiated coefficient is greater than unity, it explains that the odds are increasing, and on the other hand negative value indicates that the odds decrease. Deviation of the exponentiated coefficient value from one indicates the magnitude of impact on the odds for a unit change in independent variable. The multiple binary logistic regressions were used to find the relative importance of the factors affecting use of different services of the bank like use of Internet banking. The p-value <0.05 was considered for significance. The above tests have been applied on the primary data to analyze association the strength of relationship and correlation between different parameters as given in the questionnaire. (Mohammed, 2012)

4. Results and Discussion

4.1. Binary Logistic Regression

The results of logistic regression analysis taking use of Internet Banking as outcome factor are given in the Table-3.1. Education ($p<0.05$), occupation ($p<0.01$) and income ($p<0.01$) were found to be significantly and positively associated socio-economic factors which affects the use of Internet Banking. Likewise, bank type ($p<.05$), convenience ($p<.01$) and security risk ($p<.01$) were other important and significant factors which positively affects the use of Internet Banking. The value of log likelihood function is 531.366 the model correctly predicted 82.0 percent of the observed responses. The result clearly indicates that *H1, H2, H1a & H2a* fairly true.

Table 3.1. Variables Affecting Use of Internet Banking

	B	S.E.	Wald	Sig.	Exp (B)
Gender (1-Male, 0-Female)	0.266	0.233	1.305	0.253	1.305
Education (1-Grad/PG, 0-otherwise)	0.579	0.273	4.503	**0.034**	1.784
Occupation (1-Service/business, 0-Otherwise	0.836	0.311	7.251	**0.007**	2.308
Income (1- >Rs.100,000, 0-otherwise)	0.660	0.263	6.329	**0.012**	1.936
Metro status (1-No, 0-otherwise)	-0.087	0.283	0.095	0.758	0.917
Bank type (1-Public, 0-otherwise)	-0.536	0.246	4.763	**0.029**	0.585
Account type (1-Saving, 0-otherwise)	0.276	0.294	0.882	0.348	1.318
Bank services (1-Yes, 0-otherwise)	-0.001	0.240	0.000	0.997	0.999
Transaction cost (1-Yes, 0-otherwise)	-0.239	0.302	0.627	0.428	0.787
No. of facilities (1-Yes, 0-otherwise)	-0.084	0.292	0.083	0.774	0.920
Security risk (1-Yes, 0-otherwise)	0.785	0.292	7.201	**0.007**	2.192
Convenience (1-Yes, 0-otherwise)	1.882	0.345	29.715	**0.000**	6.569
Constant	-1.495	0.441	11.485	0.001	0.224
Value of log-likelihood function	531.366				
Cox & Snell R Square	0.136				
Nagelkerke R Square	0.512				
Correct prediction (%)	82.0				
Chi-squared (df=12)	88.021***				

The result indicates that the educated respondents use the service of internet banking. Based on occupation we can say that the service class and the business class is the one who use internet banking service to nearly 2 times as other occupation. The high income respondents having more than 1 lack income prefer to use this service. The private sector bank account holders use this service as compared to public sector banks. The banking attributes i.e. convenience and security do have very attentive influence on the use of Internet banking.

5. Conclusion and Recommendations

In case of Internet banking the results of logistic Regression was as follows the educated respondents use the service of internet banking. Based on occupation we can say that the service class and the business class is the one who use internet banking service to nearly 2 times as other occupation. The high income respondents having more than 1 lack income prefer to use this service. The private

sector bank account holders use this service as compared to public sector banks. The banking attributes i.e. convenience and security do have very attentive influence on the use of Internet banking. (Table 3.1)

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Study the Customers' Perception towards Banking Services: A Research Report on Indian Public Sector Banks

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Abstract: The aim of this study is to measure the customer satisfaction and to identify the shortfall areas for improving the services of public banking sector. For this research paper past research survey were studied. The main concept is measuring customer satisfaction by customer satisfaction index method. All the factors related to banks were taken by personal interview with the banks' manager which influences customer satisfaction. To collect the information non-probability sampling method is used. 100 services users of two different banks in bardoli region were contacted with face-to-face personal interview method through questionnaire. "Customer Satisfaction Index" method was used to measure the customer satisfaction. The study represents the result of a survey among the customers in the bardoli region of two public sector banks. Study proved that the STATE BANKS OF INDIA'S customers are more satisfied (82.55> 81.79) than BANK OF INDIA'S customers. There were parameters are found out which are more important to increasing the satisfaction rate. The results of this study provide very important information in formulating competitive marketing strategies. It shows the critical points where the limited resources of the banks should be allocated to improve satisfaction and loyalty and provides information about the weaknesses and strengths of the banks from the eyes of its customers. With getting the valuable information and found out the reason of dissatisfaction these banks can put more efforts to improving the standards of services and make the customers more satisfied.

Keywords: Customer satisfaction; CSI (Customer Satisfaction Index); Public sector banks

JEL Classification: M31

1. Introduction

Recently the concept of customer satisfaction has more valuable and prior for every organization. Customers are viewed as a group whose satisfaction with the organization must be incorporated in strategic planning efforts. With better understanding of customers' perceptions, companies can determine the actions required to meet the customers' needs. Organization can identify their own strengths and weaknesses, where they stand in comparison to their competitors, chart out path future progress and improvement. Customer satisfaction

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measurement helps to promote an increased focus on customer outcomes and stimulate improvements in the work practices and processes used within the company. The purpose of this paper is to measure the performance of banks' on customer satisfaction by customer satisfaction indices (CSIs) and show the results of a CSI study carried out on Indian public banks.

2. Brief about Banking Industry

The banking industry like many other financial service industries is facing a rapidly changing market, new technologies, economic uncertainties, competition, more demanding customers and the changing climate has presented an unprecedented set of challenges. Banking is a customer oriented services industry, therefore, the customer is the focus and customer service is the differentiating factors. Banks have also started realizing that business depends on client service and the satisfaction of the customer and this is compelling them to improve customer service and build up relationship with customers.

With the current change in the functional orientation of banks, the purpose of banking is redefined. The main driver of this change is changing customer needs and expectations. Customers in urban India no longer want to wait in long queues and spend hours in banking transactions. This change in customer attitude has gone hand in hand with the development of ATMs, phone and net banking along with availability of service right at the customer's doorstep. With the emergence of universal banking, banks aim to provide all banking product and service offering less than one roof and their endeavor is to be customer centric. Banks have been broadly divided into private and public sector. A private bank is that in which there are but few partners, and these attend personally to its management. A public bank is that in which there are numerous partners or shareholders, and they elect from their own body a certain number, who are interested with its management.

3. Literature Review

Fornell, (1992) defined customer satisfaction as a customer's post-purchase evaluation of or experience with a product or service. Researcher argued that higher customer satisfaction can lead to a strong competitive position into the market that result in increasing in market share and profit, make price inelastic, reducing business cost, reduce failure cost, and reduce the cost of attracting new customers. Researcher also argued that customer satisfaction is also a significant determinant of repeat sales, positive word-of-mouth, and customer loyalty (CL). Satisfied customers return and buy more, and they tell other people about their experiences. (Fornell, 1996)

Fornell et al., (1996) defined cumulative satisfaction as customer's overall experience with a product or service provider. This approach to satisfaction provides a more direct and comprehensive measure of a customer's consumption utility, subsequent behaviors and economic performance. CSIs were built upon a cumulative view of satisfaction.

Li et al. & Takala et al., (2006) argued that it is self evident that companies should listen to and satisfy their customers. Numerous studies have shown that the long-term success of a firm is closely related to its ability to adapt to customer needs and changing preferences.

Johnson et al., (2001) argued that the CSI model is a structural model based on the assumptions that customer satisfaction is caused by some factors such as perceived quality (PQ), perceived value (PV), expectations of customers, and image of a firm. Research proved that these factors are the antecedents of overall customer satisfaction. The model also estimates the results when a customer is satisfied or not. These results of customer satisfaction are consequences factors such as complaints or loyalty of customer.

Satisfied customers are central to optimal performance and financial returns. Placing a high priority on customer satisfaction is critical to improved organizational performance in a global marketplace. With better understanding of customers' perceptions, organization can determine the actions required to meet the customers' needs. Organization can identify their own strengths and weaknesses, where they stand in comparison to their competitors, chart out path future progress and improvement. Customer satisfaction measurement helps to promote an increased focus on customer outcomes and stimulate improvements in the work practices and processes used within the company. The working of the customer's mind is a mystery which is difficult to solve and understanding the nuances of what customer satisfaction is, a challenging task. This exercise in the context of the banking industry will give us an insight into the parameters of customer satisfaction and their measurement. This vital information will help us to build satisfaction amongst the customers and customer loyalty in the long run which is an integral part of any business. With the phenomenal increase in the country's population and the increased demand for banking services; speed, service quality and customer satisfaction are going to be key differentiators for each bank's future success. Thus it is imperative for banks to get useful feedback on their actual response time and customer service quality aspects of retail banking, which in turn will help them take positive steps to maintain a competitive edge. The customer's requirements must be translated and quantified into measurable targets. This provides an easy way to monitor improvements, and deciding upon the attributes that need to be concentrated on in order to improve customer satisfaction. We can recognize where we need to make changes to create improvements and determine if these changes, after implemented, have led to increased customer satisfaction.

Customer Satisfaction Index (CSI)

The CSI represents the overall satisfaction level of that customer as one number, usually as a percentage. Plotting this Satisfaction Index of the customer against a time scale shows exactly how well the supplier is accomplishing the task of customer satisfaction over a period of time.

Since the survey feedback comes from many respondents in one organization, the bias due to individual perception needs to be accounted for. This can be achieved by calculating the Satisfaction Index using an importance weighting based on an average of, Calculate the average importance score assigned by all respondents for each parameter of all the weightings given by the customer. Find out the weighting factor (divide the average importance score assigned by all respondents for each parameter by the sum/total of the importance score). Multiply the weighting factor with corresponding satisfaction score you can get the weighted score. Sum of the weighted score gives total customer satisfaction. Thus Customer Satisfaction can be expressed as a single number that tells the supplier where he stands today and an Improvement plan can be chalked out to further improve his performance so as to get a loyal customer. To understand the calculations consider following example in table 1:

Table 1

Parameter P	Importance score a	Weighting factor b (b=a/T)	Satisfaction score c	Weighted score d (d=b*c)
P1	a1 = 9	0.39	8	3.12
P2	a2 = 8	0.35	10	3.50
P3	a3 = 6	0.26	6	1.56
T = Total	T = 23			8.18 81.8%

a = Average importance score assigned by all respondents for each parameter

b = weighted factor (a/T)

c = Average satisfaction Score assigned by all respondents for each parameter

d = Weighted score (b*c)

Here the attempt is made to measure “customer satisfaction” of the customers belonging to private and public banks with a using of CSI method.

Objectives of the Study

Primary Objective:

"To know the satisfaction level of different customers who have the account(s) in the State Bank of India and Bank of India in Bardoli region."

Secondary Objectives:

- To know the most important parameters from the point of view of the individual banks' customers.
- To find out the most important area, which require immediate improvement to provide the maximum service to the customers?

Research Methodology

Research design: Research design is a master plan specifying the method and procedure for collection and analyzing needed information. The research design in this project is descriptive. Descriptive research includes surveys and fact-finding inquiries of different kinds. For this study, descriptive research design is used where the data is collected through the questionnaire. The information is gathered from the different customers of the two different banks. Hundred bank respondents from two banks were contacted personally in order to seek fair and frank responses on the various bank attributes which are leads to overall customers' satisfaction.

a. ***Sampling Design:*** Non-probability sampling method has been used. Sample size is 200 customers.

b. ***Sampling Element*****:** Existing customers of "public sector banks''.

c. ***Sampling unit:*** Service users of "public sector banks''.

d. ***Extent:*** Surat region- Gujarat- India.

e. ***Choice of Survey Method*****:** Here face-to-face personal interview method used.

Data Collection Method

Primary Data Sources

Primary data were collected by using of survey method of data collection. Primary data was collected to know the customers' preferences and beliefs.

Secondary Data Sources

Secondary data were collected from the magazines, websites and other such sources like internet, published reports and the fact sheets.

Types of questions: In the questionnaire, both close-ended questions and open-ended questions were included. There was 1 Ordinal Question, 29 Interval Scale Questions, 1 Open Ended Question, and 3 Close Ended Question & 5 Questions for Demographics.

Research Instrument: Questionnaire was used for the purpose of the data collection as the research instrument. This Questionnaire consisted of closed ended questions and opened ended questions including rating scales.

Pre-testing of research instrument: It is necessary to check the questionnaire before actual research is done. Therefore pre-testing is done. Here 30 respondents included in pre-testing and on the basis of feedback, questionnaire was finalized.

4. Findings

Primary objective

Primary objective of this project is to know the satisfaction level of the customers of private and public banks in Bardoli region.

To achieve this objectives there are 29 parameters have taken, which are important for clients to make a decision for evaluate the services of the different banks. Asked two questions, one for important level and other for satisfaction level with same parameters and used customer satisfaction index method. On the basis of test inferred that,

See overall interpretation in table no-2 *(Refer table no: 5 & 6 for detailed study)*

Table 2

BANK	CSI
State Bank of India	82.55%
Bank of India	81.79%

- According to total customer satisfaction method overall satisfaction level of THE STATE BANK OF INDIA'S customers is **82.55%**. Overall satisfaction level of the BANK OF INDIA'S customers is **81.79%**. So that study proved that the state bank of India has more customer satisfaction rate than bank of India.
- Particular bank wise total overall satisfaction figure are also found out in which criteria SBI have high level of customer satisfaction and where BOI have lowest level.

Secondary objective:

First secondary objective is to know the most important parameters from the point of view of the banks' customers.

- Parameters are found out which are more important for customers of banks to evaluate the performance of the banks and with extreme focus on it banks can increase their customers' satisfaction by spending more resources on it. In the table no-3 factors are including which have the importance rate nearer the 5.

Table 3.

State Bank of India	**Bank of India**
Responsibility of the staff to customer	Willingness of the staff to customer
Willingness of the staff to customer	Sympathetic staff with customer
Sympathetic staff with customer	Understanding power of the staff
Understanding power of the staff	Behavior of the staff with customer
Behavior of the staff with customer	Easy ,safe and quick transaction
Easy ,safe and quick transaction	Long operating hours of bank
Long operating hours of bank	Interest rates of borrowing & lending money
Interest rates of borrowing & lending money	Service charges
Service charges	Parking facilities
Parking facilities	Provides written documents & receipts
Provides necessary information in appropriate language	Quick problem solving
Provides written documents & receipts	Good communication with the customer while problems occurs
Quick problem solving	Security facility in the banks
Good communication with the customer while problems occurs	
Security facility in the banks	

Second secondary objective is to find out the most important area, which require immediate improvement to provide the maximum service to the customers?

- On the basis of CSI method there are various parameters found out (in table no-4) in which both the banks does their activities below the satisfaction level and are needed more resources to improve the service which leads to increase overall satisfaction level of the customers. Rest of the parameters in which bank does well are including in table given below.

Table 4.

State Bank of India	Bank of India
ATM service is available everywhere	Phone banking & Net banking facility are available
Home services facilities are available	Home services facilities are available
Long operating hours of bank	Long operating hours of bank
Interest rates of borrowing & lending money	Interest rates of borrowing & lending money
Service charges	Service charges
Advisory services	Provides necessary information by telephone/post/ mail
Telephone facility in the bank	Advisory services
	Provides drinks and beverages in the bank

5. Recommendation

From the findings, the following suggestions are being made to banks, to get optimum benefit by knowing the customer satisfaction level from the customers of Bardoli town.

1. Each type banks can attracts more customers by knowing the reason what customer thinks for use the banks for the getting benefits from the banks. Bank of India has to spend more resources to attract customers who are looking for take economic benefits.
2. Banks have to increase more facilities to current account holder. Also with spending more resources on customers, customers become more satisfied who have positive word of mouth and effective opinion leaders.
3. With focus on some parameters in which the customers' satisfaction of state bank of India's customer is greater than bank of India's customer, BOI become also successful to getting maximum satisfaction. Banks also increase the level of satisfaction by knowing the lacking areas. And also with extreme focus on the parameters which are more important for the customers. So that these efforts become leads to maximum customer satisfaction.
4. Most of the customers who uses banks having household income of less than 1, 50,000. So take all economic decision (like service charges) as per taking care of those customers.
5. Major customers of the banks are businessman and farmers. So banks have to taking economic decision to attract those customers. Businessman wants accounts for day to day transaction. So that all matter a lot to choosing bank for the businessman. And farmers are attracts with ancillary services and facilities.

6. Bank of India has to introduce some of the new schemes and extra services so that more customers are attract towards banks.

6. Conclusion and Future Research Direction

Customer satisfaction is the key to keep the existing customers. Customer satisfaction must be matching or greater than the importance level. From this research study, conclude that the overall satisfaction of the state bank of India's customers (82.55%) is more than the bank of India's (81.79%). Yet there are some aspects are noted in the recommendation, where both types of banks need to focus more in order to achieve optimum customer satisfaction. So if the banks focus on these aspects, there is no doubt about company's success in satisfying customers and thereby maintaining long term healthy relationships with customers. This study is done only for the Surat region, a small geographical area. Hence future research may be done for broader area. Further, application of CSI method can also be explored for other products or services by future researchers.

Table 5. Calculation of Total Customer Satisfaction Indexfor State Bank of India (SBI)

Parameters	**Importance Score a**	**Satisfaction score b**	**Weighting factor c = (a/T)**	**Weighted score d = (b*c)**
ATM service is available everywhere	4.58	4.78	0.034359	0.164234
Phone banking & Net banking facility are available	4.12	4.02	0.030908	0.124249
Home services facilities are available	4.18	4.32	0.031358	0.135466
Responsibility of the staff to customer	5	4.08	0.037509	0.153038
Willingness of the staff to customer	5	3.52	0.037509	0.132033
Sympathetic staff with customer	5	3.98	0.037509	0.149287
Understanding power of the staff	5	3.76	0.037509	0.141035
Behavior of the staff with customer	5	4.22	0.037509	0.15829
Easy ,safe and quick transaction	5	4.52	0.037509	0.169542
Long operating hours of bank	4.88	5	0.036609	0.183046
Interest rates of borrowing & lending money	5	5	0.037509	0.187547
Service charges	5	5	0.037509	0.187547
Sitting facilities in the bank	4.24	3.68	0.031808	0.117053
Cleanliness of the bank	3.72	3.64	0.027907	0.101581
A.C. & Atmosphere of the bank	3.9	3.76	0.029257	0.110008

Availability of the Magazine and News paper	3.74	3.42	0.028057	0.095955
Parking facilities	4.98	3.36	0.037359	0.125527
Provides necessary information by telephone/post/ mail	5	4.36	0.037509	0.163541
Provides necessary information in Appropriate language	5	3.78	0.037509	0.141785
Provides written documents & receipts	5	4.46	0.037509	0.167292
Quick problem solving	5	3.66	0.037509	0.137284
Good communication with the customer while problems occurs	5	4.44	0.037509	0.166542
Taking opinions for providing maximum services	4.8	4.02	0.036009	0.144756
Advisory services	3.18	3.66	0.023856	0.087313
Telephone facility in the bank	3.9	4	0.029257	0.117029
Provides drinks and beverages in the bank	5	4.28	0.037509	0.16054
Availability of the toilet & washrooms in the bank	4.16	4.13	0.031208	0.128888
Availability of the medical facility in the bank	3.92	3.62	0.029407	0.106455
Security facility in the banks	5	4.56	0.037509	0.171043
Total	T = 133.3			∑d = 4.127907
				[4.12790 *2=8.255]
			CSI	**82.55%**

For State Bank of India

Overall customer satisfaction index= 82.55

Table 6. Calculation of Total Customer Satisfaction Index for Bank of India (BOI)

Parameters	**Importance Score a**	**Satisfaction score b**	**Weighting factor c = (a/T)**	**Weighted score d = (b*c)**
ATM service is available everywhere	4.32	2.44	0.033682	0.082183
Phone banking & Net banking facility are available	3.52	3.96	0.027444	0.108679
Home services facilities are available	3.46	4	0.026976	0.107906
Responsibility of the staff to customer	5	3.98	0.038983	0.155154
Willingness of the staff to	4.92	3.86	0.03836	0.148068

customer				
Sympathetic staff with customer	4.96	3.74	0.038671	0.144631
Understanding power of the staff	4.94	4.1	0.038516	0.157914
Behavior of the staff with customer	4.96	3.58	0.038671	0.138444
Easy ,safe and quick transaction	4.92	4.22	0.03836	0.161877
Long operating hours of bank	4.8	5	0.037424	0.18712
Interest rates of borrowing & lending money	5	5	0.038983	0.194917
Service charges	5	4.96	0.038983	0.193357
Sitting facilities in the bank	3.36	3.38	0.026197	0.088545
Cleanliness of the bank	3.74	3.98	0.02916	0.116055
A.C. & Atmosphere of the bank	4.14	4.04	0.032278	0.130404
Availability of the Magazine and News paper	3.98	3.42	0.031031	0.106125
Parking facilities	4.98	3.96	0.038827	0.153756
Provides necessary information by telephone/post/ mail	4.02	4.06	0.031343	0.127251
Provides necessary information in Appropriate language	4.72	4.22	0.0368	0.155297
Provides written documents & receipts	4.98	4.72	0.038827	0.183265
Quick problem solving	4.78	4.2	0.037268	0.156526
Good communication with the customer while problems occurs	4.94	4.62	0.038516	0.177942
Taking opinions for providing maximum services	4.22	4.14	0.032902	0.136214
Advisory services	4.02	4.04	0.031343	0.126624
Telephone facility in the bank	4.04	3.8	0.031499	0.119694
Provides drinks and beverages in the bank	3.96	4.56	0.030875	0.140789
Availability of the toilet & washrooms in the bank	4.18	3.98	0.03259	0.129708
Availability of the medical facility in the bank	3.4	3.03	0.026509	0.080321
Security facility in the banks	5	4.64	0.038983	0.180883
Total	T = 128.26			∑d = 4.089649
				[4.08964 *2=8.179]
			CSI	**81.79%**

For Bank of India

Overall customer satisfaction index= 81.79%

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Relationship between Gold and Oil Prices and Stock Market Returns

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Abstract: This study objective to examine the relationship between gold prices, oil prices and KSE100 return. This study important for the investor whose want to invest in real assets and financial assets. This study helps investor to achieve the portfolio diversification. This study uses the monthly data of gold prices, KSE100, and oil prices for the period of 2000 to 2010 (monthly). This study applied Descriptive statistics, Augmented Dickey Fuller test Phillip Perron test, Johansen and Jelseluis Co-integration test, *Variance* Decomposition test to find relationship. This study concludes that Gold prices growth, Oil prices growth and KSE100 return have no significant relationship in the long run. This study provides information to the investors who want to get the benefit of diversification by investing in Gold, Oil and stock market. In the current era Gold prices and oil prices are fluctuating day by day and investors think that stock returns may or may not affected by these fluctuations. This study is unique because it focuses on current issues and takes the current data in this research to help the investment institutions or portfolio managers.

Keywords: KSE100 return; descriptive statistics; co-integration test; unit root test; granger causality test

JEL Classification: G10; G20

1. Introduction

Gold has been used in market since 1971 as commodity. The importance of gold has been increased in the present world due to the financial crisis in the present economic world. The investors are investing in the Gold. In the recent decade the gold prices and oil prices rise day by day. Pakistan is in possession of 1339.25 tons of gold reserves. Pakistan is the 5th largest country in the world having gold reserve. The production of gold in Pakistan is very low and it has recently joined

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the group of gold producing countries because of Saindak Copper-Gold Project in Baluchistan (Daily Times, 2009). In Present situation gold has attracted the investors due to a little chance to go better outcomes in the stock market investments due to fragile economic and financial position in Pakistan.

In market a market where shares are traded, is called stock market or equity market. In 2002 Karachi Stock Exchange (KSE) Pakistan was declared as a best market in the world by the international magazine Business Week (Bloomberg Business Week, 2002) and with reference to Sheth (2008) also got leading status in global emerging market before 2007. Karachi Stock Exchange (KSE) is working as a main stock exchange of Pakistan watching worst sell-off positions in the present situations. Investors are showing low interest in the stock markets and investing in highly solid investment like gold due to rising trend in gold prices.

The purpose of this study is to explore the relationship between the Gold prices, Stock market return and Oil prices. The data is taken from KSE100 return, Gold price and Oil prices from 2000 to 2010(monthly). This study applied Descriptive statistics, Augmented Dickey Fuller test Phillip Perron test, Johansen and Jelseluis Co-integration test, *Variance* Decomposition test to find relationship between oil prices and Gold prices with KSE 100 Returns. This study concludes that Gold prices growth, Oil prices growth and KSE100 return have no significant relationship in the long run. Further research will be conducted on why Gold prices and oil prices have not significant relationship with KSE 100 returns. Further research will be also conducted on Gold prices and Oil prices relationship with other stock markets returns. Second chapter cover the literature review, third chapter covers the data and methodology, fourth chapter covers the results and their interpretation and the last chapter covers the conclusion and references.

2. Literature Review

Shahzadi And Chohan (2010) conduct study on impact of gold prices on stock exchange by using data from 2006 to 2010 (five years) of KSE (Karachi Stock Exchange) and gold market. This study uses Descriptive statistics, Unit Root Test of Augmented Dickey Fuller (ADF), Unit Root Test of Phillip Perron, Johansen's Co Integration Test and Granger Causality Test (GCT) to find the impact of gold prices on KSE (Karachi Stock Exchange). This study uses average gold prices and KSE-100 index as variables. Stock exchange indices (KSE) taken from Yahoo Finance and gold prices from online website (Forex, 2011). The results shown that there is a negative Correlation between the gold prices and Karachi stock exchange indices, co-integration test provided that there is not a long run relationship between the both variables, Granger Causality test cannot be applied because there is no co-integration between the two variables. So, It is concluded that gold is not the factor to effect the stock exchange, some other factors like security problems,

fragile economic conditions, and instable political environment are directly affecting the stock exchanges. Haroon et al. investigated on the south Asian Equity Market relationship. Four major markets Karachi Stock Exchange, Dhaka Stock Exchange, Bombay Stock Exchange, and Colombo Stock Exchange were taken to examine the relationship. Data is taken from the year 1999 to 2009 on monthly basis. This study uses Descriptive Statistics, Vector Auto Regression (VAR Technique), Unit Root Test, Johansen and Juselius Co-integration Test, Granger Causality Test and Error correction model is used to investigate the relationship among the South Asian Equity markets. Descriptive statistics results show that Karachi Stock Exchange and Dhaka Stock Exchange are found with high returns and high risk, while Bombay Stock Exchange is giving lower returns with high risk. Results of correlation analysis show that there exists no significant correlation between these markets. Correlation results were showing positive correlation but it is very low to establish any significant relationship among these markets.

Kaliyamoorthy and Parithi (2010) conducted a study on relationship between gold market and stock market. NSE monthly index data and monthly gold prices is taken as variable from June 2009 to June 2010. Chi square is applied to find relationship between gold prices and Stock market indices. The result shows that there is no relationship between gold prices and stock market indices. Stock market indices are increased and gold market is also increased, but stock market is not a reason for increase in the gold rates. Another study is made by Nguyen et al. (2010) conducted study on Co-movement of Stock Market and Gold Prices. To analyze the co-movement between markets data collected from seven countries including Japan, Singapore, UK, Indonesia, Malaysia, the Philippines, Thailand and US. This study used data of the indices from 1999 to 2010 to calculate the dependence of gold market and stock market. This study applied correlation, Archimedean copulas and linear convex combination tests to analysis the data. This research result shows that most of the stock market showed no dependence with the gold price while Indonesia, Japan and the Philippines market have left tail dependence. Malaysian stock market has right tail dependence on gold market.

Twite (2000) Studied on Gold Prices, Exchange Rates, Gold Stocks and the Gold Premium. The price of gold-mining stock increases 0.76% for each 1.00% change. The paper initially studies the 12 gold-mining firms in the period January 1985 to December 1998, on changes in the gold price. This research applied Descriptive statistics, computing Beta, correlation and Auto correlation to explore the relationship between the markets. There is no relationship found between gold premium, reserve ratio and gold prices. Toraman et al. (2011) conduct study on the factors affecting the prices of gold. This study takes oil prices, dollar index, Dow Jones Industrial Production Index, USA reel Interest Rates and USA inflation as variables. The study data consist of monthly data beginning from January 1992 to March 2010 of all indices. This study applied augmented dickey fuller test (ADF)

and Phiplip Peron (PP) test to find out unit root. The Correlation, ARCH (Autoregressive conditional heteroskedasticity) model and GARCH (Generalized Autoregressive Conditional Heteroskedasticity) models also applied to find out the relationship. By empirical finding highly negative correlation is found between gold prices and USA exchange rates. The results also indicate that there is a positive relationship between the oil prices and stock prices.

Simakova analyze the Relationship between Oil and Gold Prices for the period 1970 to 2010. Consumer Price Index (CPI), Rate of U.S. three-month Treasury bills (TB3MS), Index of industrial production Gold mining index (GMI), and capacity utilization (IND) are used as variables. The data sample is taken from 2000 to 2010 (131 observations) and 2000 to 2007 (96 observations) to determine the relationship and how other factors influences the stock exchange prices. Granger causality test, Descriptive statistics and Quantitative analysis, Vector Error Correction model are used to find relationship between the gold and oil prices. Quantitative analyses show Co-movement between oil and gold prices. Correlation analyses show co-movement in oil price and interest rates and opposite movement in gold price and interest rates. Co integration test also present long-term relationship between all variables. Bhunia and Das (2012) made a study on the association between gold prices and stock market returns. This study is based on data gathered from different data sources are ministry of finance, NSE database and Bloomberg database (India). This study used Eviews 6.0 program for arranging the data and conducting econometric analyses to use Johansen's (1995) Co-integration Test, Augmented Dickey-Fuller (ADF) Unit Root (1981) Test and Granger (1969) Causality Test. This research used all these tests for the purpose to find association between the variables. This study concluded that the existence co-movement of stock prices and gold prices during the period financial crisis and thereafter. There exist co-integrations in four countries (Japan, Germany, Taiwan, and China) indicates that there exist long-term stable relationships among these variables. While there is no co-integration relationship among these variables and the U.S. stock market.

Mishra et al. (2010) made a study on the volatility of gold price and stock market in India. This study uses data monthly from the database of reserve bank of India. This research analyzes the data from 1970 to 2009 annual price movement of gold in Indian market and stock market, BSE 100 index period January 1991 to December 2009. This study used Augmented Dickey-Fuller unit root, Granger Causality test and Co-integration test. This study tells that there exist long run equilibrium relation between gold market prices and stock market in India. Smith (2001) conduct research is on the relationship between stock exchange prices and gold price using daily, weekly and monthly data from 1991 to 2001. Four gold prices and six stock exchange indices were included in the study. This study takes gold data from three London gold market Prices and US market. For this research

data was taken from six stock exchanges which included Hong Kong stock exchange, Japan, Australia, Germany, France and US stock exchange. A small relationship was observed in the period between gold price and stock exchange price index.

Gilmore at al. (2009) Investigated on the dynamic relationship between stock exchanges indices of gold mining companies, gold prices and co-movements of stock market prices. This research used weekly data of Wednesday from the period of June 5, 1996, to January 31, 2007. This study collected the data from three stock market price indices (LCAP, MCAP and SCAP). The number of total observations is 557 that have been analyzed. This study applied Unit Root Tests, Vector Error-Correction (VEC), and Co-integration technique to examine the relationship among the variables. This research concluded that each stock market index that there is long-run relationship between gold mining company stock prices. Miyazaki et al. (2012) Researched on the dynamic interdependence among gold market and other financial markets including the stock, foreign exchange markets, and bond, by using asymmetric dynamic conditional correlation (A-DCC) model. This study uses descriptive statistics, univariate volatility models, GARCH models, EGARCH model, standard deviation and dynamic conditional correlation model to find the dynamic conditional correlation with conditional asymmetry. The data is taken from London Bullion Market Association (LBMA) from January 4, 2000, to July 29, 2011. S&P500 index and US dollar & Euro exchange rate is taken from the Federal Reserve Bank of St. Louis homepage. World Government Bond Index in US (WGBIUS) is taken as a rate of return on bonds. The results identified that complimentary asymmetry in the dynamic conditional correlation is only between gold and the US dollar & Euro and a structural break is appeared in the dynamic conditional correlation for the pair of gold and S & P500 index after bankrupts of Lehman Brothers.

3. Methodology

Data Collection

This study use secondary data from different websites, journals, books, also from different news papers and reports. This study is used the monthly stock values of KSE100 return (Pakistan) and monthly average gold prices (measured in grams) and oil prices for the period of 2000 to 2010.

This study applied Descriptive statistics to find out the mean, median, standard deviation and skewness of data. Augmented Dickey Fuller Test and Phillip Perron test is applied to find out the unit root. Johansen and Jelseluis Co-integration test is applied to find out the long run relationship between the variables. Granger Causality used to find out the Lead and Lag relationship. Further varience

decomposition and impulse response function is applied to explore the co-movements between KSE100, Gold Prices and Oil prices.

Return on index is calculated as

RT = ln (PT/PT-1)

Where:

RT = Return on month `t`

PT = Index closing prices on month `t`

PT-1 = Index closing prices on month `t-1`

Ln = Natural log.

While Growth in Gold Prices calculated as

GRG = ln (GT/GT-1)

Where:

GT = Return on month `t`

G = Index closing prices on month `t`

GT-1 = Index closing prices on month `t-1`

Ln = Natural log.

While Growth in Oil Prices calculated as

GRO = ln (OT/OT-1)

Where:

OT = Return on month `t`

O = Index closing prices on month `t`

OT-1 = Index closing prices on month `t-1`

Ln = Natural log.

In this research we use and analyze the monthly data of stock exchange market prices and gold prices and Oil prices.

Hypotheses:

H1: There is No Long run relationship exists between gold prices and stock market returns.

Ho: There is Long run relationship exists between gold prices and stock market returns.

H2: There is No Long run relationship exists between oil prices and stock market returns.

Ho: There is Long run relationship exists between Oil prices and stock market returns.

Results

Table 1. Descriptive Statistics

	GOLD	INDEX	OIL
Mean	0.012025	0.014502	0.009181
Median	0.008601	0.017723	0.0217
Maximum	0.102168	0.241106	0.256847
Minimum	-0.124798	-0.448796	-0.403033
Std. Dev.	0.038715	0.089981	0.103374
Skewness	-0.266156	-1.114058	-1.042827
Kurtosis	3.925805	7.719395	5.181337
Jarque-Bera	6.272589	149.8045	50.09499
Probability	0.043443	0	0
Sum	1.587354	1.914199	1.211946
Sum Sq. Dev.	0.196354	1.060648	1.399897

Table 1 represents the descriptive statistics of variables. The table shows the Mean, Median, Maximum, Minimum, Standard deviation and Skewness. The results show that KSE100 has the high return of 0.014502. Gold has growth value of 0.012025 and Oil growth value of 0.00918. KSE100 returns has the standard deviation value of 0.089981, while gold has Standard Deviation of 0.038715 and the Oil standard deviation value is 0.103374.

Table 2. Correlation Matrix

	GOLD	INDEX	OIL
GOLD	1		
INDEX	-0.038619	1	
OIL	0.190822	0.207851	1

Table 2 shows the correlation results for the Gold, KSE and Oil markets that there exists no significant relationship between these markets. KSE100 has a negative correlation with the Gold market. The oil growth has weak positive correlation with the KSE100. However these results provide information to the investors who want to get the benefit of diversification. Correlation is not an authentic measure to

find the co-integration, because it discusses only the relaionship and not the lead lag relationship. So, Co-integration and Granger causality are used to solve the problem.

Table 3. Unit Root Test

	ADF Level	**ADF First Difference**	**Philip perron test**	**PP First Difference**
Gold	1.00425	-10.9787	1.069803	-10.9744
KSE	-0.88868	-10.3078	-0.90602	-10.31061
OIL	-1.38549	-8.89619	-1.4519	-8.89619
Critical Values				
1% level	-3.48082	-3.48122	-3.48082	-3.48122
5% level	-2.88358	-2.88375	-2.88358	-2.88375
10% level	-2.5786	-2.57869	-2.5786	-2.57869

Unit root test is applied to check the stationary of the data. Augmented Dickey Fuller and Phillip Peron test were applied for this purpose. In the table 3 at level the data is not stationary because the calculated values are less than the critical values. The data become stationary at the first difference because the Calculated Values are greater than the critical values. Phillip Peron test applied for the confirmation of stationary of data.

Table 4.1. Multivariate Co-integration Analysis

	Eigenvalue	**Trace Statistic**	**Critical Value**	**Prob.****	**Remarks**
Gold	0.164894	27.18099	29.79707	0.0973	
KSE	0.028071	3.755464	15.49471	0.9223	No co-integration
OIL	0.000415	0.053977	3.841466	0.8163	

To find out the Long run relation then among the variable we applied co-integration test. Results have shown in the multivariate co-integration table 4.1 shows that there exists no co-integration, because the Eigen values and Trace Statistics are less than the critical values. Gold, KSE100 and Oil has less Eigen and trace statistics than the critical values.

Table 4.2. Bivariate Co-integration Analysis

	Eigenvalue	**Trace Statistic**	**Critical Value**	**Prob.****	**Remarks**
KSE	0.028455	3.754244	15.49471	0.9223	No co-integration
Gold	1.11E-05	0.00144	3.841466	0.9682	
KSE	0.135197	20.17772	15.49471	0.0091	No co-integration
OIL	0.009911	1.294794	3.841466	0.2552	

Table 4.2 represents the bivariate co-integration results. The result shows that there is no significant co-integration between Gold prices and stock market return because critical values are greater than Trace statistics. KSE100 and oil have also no co-integration because the trace statistics are less than the critical values. However Co-integration test does not tells the lead lag so Granger causality test is applied for desired results.

Table 5. Pairwise Granger Causality Tests

Null Hypothesis:	Observations	F-Statistic	Probability
Δ KSE100 does not Granger Cause Δ GOLD Δ GOLD does not Granger Cause Δ KSE100	131	0.55513 1.40129	0.4576 1.4013
Δ OIL does not Granger Cause Δ Gold Δ GOLD does not Granger Cause Δ Oil	131	0.00613 3.08045	0.9377 0.0816
Δ OIL does not Granger Cause Δ INDEX Δ INDEX does not Granger Cause Δ OIL	131	1.68383	0.1967 0.2686

Granger Causality test is used to check the lead lag relationship, table 5 shows the related results. KSE100 has no Granger cause with Gold growth. Oil has no Granger cause with Gold growth and Oil has also no Granger cause with KSE100.

Table 6.1. Variance Decomposition of GOLD

Period	S.E.	GOLD	INDEX	OIL
1	0.0392	100	0	0
2	0.039304	99.57049	0.424216	0.005293
3	0.039306	99.56299	0.429654	0.007354
4	0.039306	99.56252	0.429929	0.00755
5	0.039306	99.56249	0.429948	0.007564
6	0.039306	99.56249	0.42995	0.007565
7	0.039306	99.56249	0.42995	0.007565
8	0.039306	99.56249	0.42995	0.007565
9	0.039306	99.56249	0.42995	0.007565
10	0.039306	99.56249	0.42995	0.007565

The variance decomposition result shows that the variance occurs in the gold prices due its in fluctuation but negligible changes occur in gold prices due to KSE100 prices and oil prices.

Table 6.2. Variance Decomposition of KSE INDEX

Period	S.E.	GOLD	INDEX	OIL
1	0.090078	0.236861	99.76314	0
2	0.091281	1.185276	97.98617	0.828553
3	0.091374	1.264104	97.85621	0.879684
4	0.09138	1.269744	97.84703	0.883231
5	0.091381	1.270148	97.84637	0.883484
6	0.091381	1.270177	97.84632	0.883503
7	0.091381	1.27018	97.84632	0.883504
8	0.091381	1.27018	97.84632	0.883504
9	0.091381	1.27018	97.84632	0.883504
10	0.091381	1.27018	97.84632	0.883504

The results in the above given table 6.2 shows that change in KSE index 99.76314% is due to its own market fluctuations and 0.236861% change is due to Gold market, and the remaining Oil market have no impact on the KSE100 return.

Table 6.3. Variance Decomposition of OIL

Period	S.E.	GOLD	INDEX	OIL
1	0.100164	3.426002	3.126474	93.44752
2	0.104643	6.670646	4.825922	88.50343
3	0.104971	6.880735	5.008941	88.11032
4	0.104995	6.895482	5.022445	88.08207
5	0.104997	6.896538	5.023414	88.08005
6	0.104997	6.896614	5.023483	88.0799
7	0.104997	6.896619	5.023488	88.07989
8	0.104997	6.89662	5.023489	88.07989
9	0.104997	6.89662	5.023489	88.07989
10	0.104997	6.89662	5.023489	88.07989

In the above table results represents that 93.44752% change in the Oil market is due to its own market fluctuations and 3.126474% change is due to KSE100 return and 3.426002% change is affected by Gold market fluctuations.

4. Conclusion

In this study we take KSE100 return, Gold prices and Oil prices. This study investigates that there is any long run relationship between KSE100 return, Gold prices and oil prices. The result reveals that KSE100 has the high return. Gold and Oil market have low growth. ADF and PP test are used for the stationary of the data and found that the data is integrated at the same level. The results of Multi variate and and Bivariate co-integration test reveals that there is no co-movement between KSE100 return, Gold growth and Oil growth. The result of Granger Causality test show that KSE100 return has no Granger cause with Gold growth

while Gold has Granger cause with Oil growth; Oil has no granger cause with KSE100. The result of Impulse response shows that KSE100 is not influenced by Gold and Oil prices fluctuation, and neither Gold nor Oil markets are influenced by KSE100 return. This study supports the Shehzadi and Chohan (2010) that there is no long run relationship between gold prices and stock market returns. This study suggest that at Stock Market returns are not Influenced by Gold and Oil prices, Further Investors make an investment simultaneously in Gold Market, Oil Marker and Equity Market for the purpose of diversify the investment portfolio.

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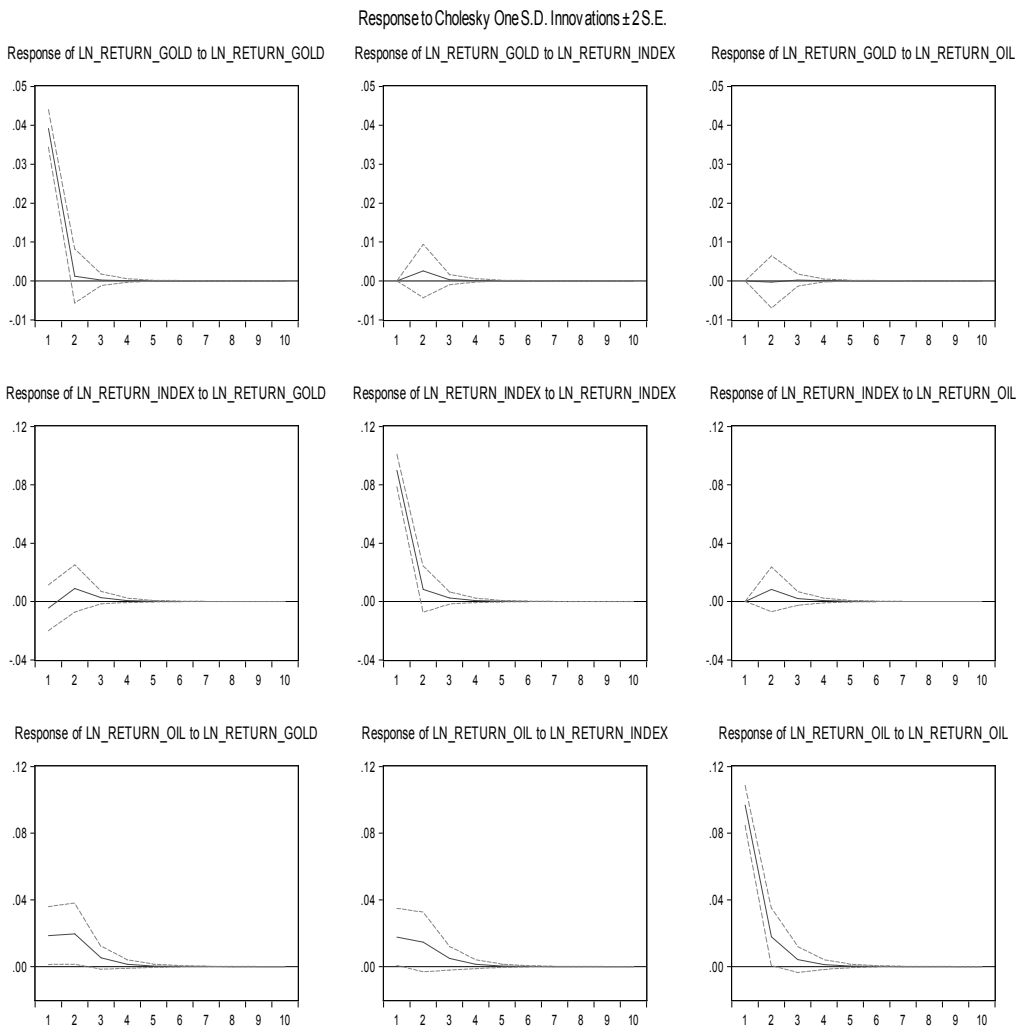
Appendix

Impulse response



A Case Study of the Accounting Models for the Participants in an Emissions Trading Scheme

Marius Deac[1]

Abstract: As emissions trading schemes are becoming more popular across the world, accounting has to keep up with these new economic developments. The absence of guidance regarding the accounting for greenhouse gases (GHGs) emissions generated by the withdrawal of IFRIC 3- Emission Rights - is the main reason why there is a diversity of accounting practices. This diversity of accounting methods makes the financial statements of companies that are taking part in emissions trading schemes like EU ETS, difficult to compare. The present paper uses a case study that assumes the existence of three entities that have chosen three different accounting methods: the IFRIC 3 cost model, the IFRIC 3 revaluation model and the "off balance sheet" approach. This illustrates how the choice of an accounting method regarding GHGs emissions influences their interim and annual reports through the chances in the companies' balance sheet and financial results.

Keywords: accounting for GHGs; sustainability accounting; carbon accounting; IFRIC 3; Emissions Trading

JEL Classification: M41; M48

1. Introduction

As a result of the Kyoto Protocol, a wide range of emissions trading schemes have emerged all around the world. Two types of schemes have been implemented: cap & trade schemes and baseline & credit schemes.

In a cap and trade scheme there is an overall limit to the emissions of all participants. An authority, (typically the government in a mandatory cap & trade scheme) sets a cap on the emissions (the maximum allowable emissions for all the participants in the scheme). It then allocates greenhouse gas emission allowances to the installations that are in the scope of the scheme that are equivalent to the previously set emissions cap. Emissions of greenhouse gases are monitored and at the end of the compliance period, the participants must surrender a number of allowances that are equivalent to their actual emissions.

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The participants in a cap and trade scheme are allowed to trade the allowances. If an installation has emitted less than its allocated allowances, it can sell the spare allowances to another organization that has fewer allowances than its GHGs emissions. This will constitute an incentive for the operators of the installations where it is cheap to decrease emissions to sell the allowances to the entities where the reduction of GHGs emissions is more expensive than to buy the allowances. This mechanism enables operators to meet the overall greenhouse gases cap at the lowest possible cost.

The compliance periods are usually set to span over a few years. For administrative purposes, compliance periods are split into yearly monitoring periods. The phases of an emissions trading year in the main cap & trade scheme (EU ETS) are illustrated in Figure 1.

Figure 1. The Emissions Trading Year in a Cap & Trade Scheme (EU ETS)

Source: SEPA (2012)

In a baseline and credit scheme, there is also a cap on the overall emissions of the participants. The authority that supervises the scheme (typically the government in a mandatory baseline and credit scheme), then allocates baselines to the participants, representing the allowable emissions limit for a specific participant. Unlike the allowances that are issued in a cap and trade scheme, baselines are not tradable. At the end of the compliance period, after the actual emissions are verified, the government allocates credits to the participants that have maintained their actual emissions below the allocated baseline. Credits can be traded or can be used to offset excess emissions in future compliance periods.

The participants that have emitted GHGs above their allocated baselines are required to surrender credits to cover the excess emissions, a few months after the

compliance period has ended. The credits can be traded between their allocation date and the deadline for surrendering the credits for excess emitters. This makes the trading period in a baseline and credit scheme very narrow compared to a cap & trade scheme (a few month vs. the whole year).

Table 1. Emissions Trading Schemes Classification

		Scheme type	
		Cap & trade	**Baseline and credit**
Scheme participation	**Mandatory**	Mandatory cap & trade schemes	Mandatory baseline and credit schemes
	Voluntary	Voluntary cap & trade schemes	Voluntary baseline and credit schemes

Source: Based on IFAC (2012)

Mandatory cap & trade schemes are schemes with compulsory participation. The main example of this type of scheme is the European Union Emissions Trading Scheme - EU ETS (EU, 2003, 2004).

The main example of a voluntary cap & trade scheme is the Chicago Climate Exchange (CCX) that was established in 2003 with the aim of reducing the GHGs emissions in US. CCX operated two four-year commitment periods (the first one between 2003-2006 followed by a second one between 2007 and 2010). The Chicago Climate Exchange closed its operations by the end of 2010 due to the lack of legislative interest (Smith, 2010).

The first mandatory baseline and credit scheme was the New South Wales Greenhouse Gas Reduction Scheme (GGAS) (IFAC, 2012). GGAS has been launched on 1 January 2003 (GGAS, 2011). The scheme ended in 2012 and has been replaced by a carbon tax (MRE, 2012).

The main example of a voluntary baseline and credit scheme is the Clean Development Mechanism introduced by the Kyoto Protocol.

2. Accounting Background

As the upcoming start of the first phase in the EU ETS scheme was closing in, and it coincided with the first year of implementation of the IASs for listed companies throughout EU, IFRIC was given the task to develop mandatory guidance for financial reporting of emissions rights.

On 15 May 2003, IFRIC has released the first draft (D1) of IFRIC 3 - Emission Rights (IASB, 2003). IFRIC 3 D1 was available on IASB's website during the comment period. 40 comment letters were received until the comment deadline which ended on 14 July 2003 (IAS Plus, 2012; Zhang-Debreceny, 2010).

The final version of IFRIC 3 „Emission Rights" was released on 2 December 2004 (IASB, 2004), with the intention to be effective for annual periods beginning after 1 March 2005, the first year of the EU Emission Trading Scheme implementation.

IFRIC 3 considered that, on initial recognition, the emission allowances should be recognized as an intangible asset measured at their fair value. The entity should follow the recommendations of IAS 38 "Intangible Assets" (IASB, 2012a). If acquired for a value that is less than their fair value, a government grant should be recognized in accordance with IAS 20 "Accounting for Government Grants and Disclosure of Government Assistance" (IASB, 2012b). The government grant should be treated as deferred income and should be recognized systematically as income over the period for which the emissions allowances were issued. The subsequent evaluation of the emissions allowances can be done under either the cost or the revaluation model described in IAS 38. The entity should recognize a liability, as it emits greenhouse gases, for its obligation to deliver a number of allowances equal to the actual emissions. IFRIC has interpreted this liability to be a provision as described by IAS 37 "Provisions, Contingent Liabilities and Contingent Assets" (IASB, 2012c) as the recognition of the liability requires the estimation of the costs (e.g. the present market value of the allowances required to cover the actual emissions at the balance sheet date).

Right from the start, the interpretation has been controversial. In a letter to the general director of the European Commission Directorate General for the Internal Market, EFRAG (The Technical Expert Group of the European Financial Reporting Advisory Group), recommended the EU commission not to adopt IFRIC 3 (EFRAG, 2005; Deloitte, 2005).

In the case of an entity that applies the cost model described in IFRIC 3, EFRAG was concerned that it would generate a measurement mismatch between the assets and liabilities (the emissions allowances at hand are measured at cost and their corresponding liability is measured at fair value). This will lead to artificial values in the balance sheet of an entity which does not trade these certificates, but is affected by changes in the market price of the allowances.

For an entity that follows the revaluation model described in IFRIC 3, EFRAG estimated that it would create a mismatch in the place where the gains and losses are presented. This model would not generate a measurement mismatch like the one described in the previous paragraph but it introduces a new discrepancy if the value of the emissions allowances changes, as revaluation gains are recognized directly in equity (other comprehensive income) while expenses relating to the revaluation of the liability are recognized in the profit and loss account.

Applying IFRIC 3 would also generate a timing mismatch between the moment the asset is recognized (when the allowances are obtained – allocated by the

government or purchased), and the moment when the liability would be recognized (as the entity emits GHGs).

EFRAG has also showed concerns regarding the measurement of the asset (the allowances) and liabilities (the provision) that must be continued until the settlement of the liability even though the compliance period is over.

IFRIC has withdrawn IFRIC 3 shortly after it was issued (IASB, 2005). In December 2007, IASB has started a new and more comprehensive project called Emissions Trading Schemes Project in order to provide guidance on accounting for carbon allowances (IFRIC 3 has covered just the accounting of emission rights in a cap & trade scheme while the Emissions Trading Schemes Project is taking into consideration both cap & trade and baseline & credit schemes with voluntary and mandatory participation) (IASB, 2011; FASB, 2010).

Work on the Emissions Trading Schemes Project has been paused in November 2010 when, in a joint meeting between the IASB and the FASB the timetable of several projects including the Emissions Trading Schemes has been amended (IASB, 2011).

As there is no mandatory guidance for the accounting of the emissions right for an entity participating in an emissions trading scheme, since the withdrawal of IFRIC 3, entities use a variety of accounting approaches (IETA, 2007).

One of the alternatives to IFRIC 3 is the "net liability" or "off balance sheet" approach. An entity that makes use of this accounting method should recognize no asset and no deferred income as the emissions allowances are received. The allowances are recorded off balance sheet at their nominal value (zero if they are received for free). As the allowances are used to counterbalance the liability, no balance sheet accounting entries are made if the allowances are enough to cover the entities obligations arising from its CO2 emissions. If the entity has a deficit of allowances, the entity should recognize a provision measured at the present market value of the allowances required to cover its emissions obligation.

3. The Case Study

The following case study will compare the influence of the accounting approach for a company in the scope of an emission trade scheme like EU ETS. The study assumes the existence of three entities (Company A, B and C) that have chosen the three different accounting methods presented in the previous paragraph (Company A uses IFRIC 3 cost model, Company B uses IFRIC 3 revaluation model and Company C the "off balance sheet" approach)

In order to preserve the comparability, the case study follows the same example used by Cook (Cook, 2009), but adds the "off balance sheet" approach. The example also uses the assumptions on which Cook has based his case study:

- The entities' financial year coincides with the annual cycle for the allocation of allowances and accountability of the emissions, (from January to December);
- The entities' receive a grant of allowances covering 12,000 metric tonne (m.t.) of emissions.
- The fair value of allowances fluctuates as presented in Table 2.
- The entity's expected annual emissions and its actual emissions are presented in Table 3.
- On 31 December the entity buys 500 additional allowances at 11 currency units (c.u.) per allowance to cover its liability for the 500 m.t. of excess emissions.

The influence of the accounting model on the companies' balance sheet is presented in Table 4. Table 5 shows the influence of the accounting model on the companies' income statement.

Table 2. The Fluctuation of Allowances Fair Value [c.u. / m.t.]

Date:	***01 January***	***30 June***	***31 December***	***30 April next year***
Allowances fair value	10	12	11	11

Source: The Example Uses the Same Data as Cook (2009)

Table 3. The Entities Estimated and Actual Emissions [m.t.]

Date:	**01 January**	**30 June**	**31 December**
Entity's annual emissions estimations	12,000	12,000	-
Entity's actual emissions	-	5,500	7,000

Source: The Example Uses the Same Data as Cook (2009)

Table 4. The Influence of the Accounting Model on the Companies' Balance Sheet [c.u.]

	Company A IFRIC 3 cost model			**Company B IFRIC 3 revaluation model**			**Company C. "Off balance sheet" approach**		
	30.06.N	**31.12.N**	**30.06.N+1**	**30.06.N**	**31.12.N**	**30.06.N+1**	**30.06.N**	**31.12.N**	**30.06.N+1**
ASSETS									
Allowances	120,000	125,500	0	144,000	137,500	0	0	5,500	0
Cash	0	(5,500)	(5.500)	0	(5,500)	(5,500)	0	(5,500)	(5,500)
Total	120,000	120,000	(5.500)	144,000	132,000	(5,500)	0	0	(5,500)
LIABILITIES									
Deferred Income (Govt. Grant)	65,000	0	0	65,000	0	0	0	0	0
Emission Liability	66,000	137,500	0	66,000	137,500	0	0	5,500	0
Total	131,000	137,500	0	131,000	137,500	0	0	5,500	0
EQUITY									
Other comprehensive income	0	0	0	24,000	12,000	12,000			
Current year result	(11,000)	(17,500)	12,000	(11,000)	(17,500)	0	0	(5,500)	0
Previous year result	0	0	(17,500)	0	0	(17,500)	0	0	(5.500)
Total	(11,000)	(17,500)	(5,500)	13,000	(5,500)	(17,500)	0	(5,500)	(5,500)
Liabilities & Equity Total	120,000	120,000	(5,500)	144,000	132,000	(5,500)	0	0	(5,500)

Table 5. The Influence of the Accounting Model on the Companies' Financial Results [c.u.]

	Company A IFRIC 3 cost model			**Company B IFRIC 3 revaluation model**			**Company C. "Off balance sheet" approach**		
	30.06.N	**31.12.N**	**30.06.N+1**	**30.06.N**	**31.12.N**	**30.06.N+1**	**30.06.N**	**31.12.N**	**30.06.N+1**
INCOME									
Income from government grant	55,000	120,000	0	55,000	120,000	0	0	0	0
Gains on disposal of allowances	0	0	12,000	0	0	0	0	0	0
Total	55,000	120,000	12,000	55,000	120,000	0	0	0	0
EXPENSES									
Emissions cost	66,000	137,500	0	66,000	137,500	0	0	5,500	0
Total	66,000	137,500	0	66,000	137,500	0	0	5,500	0
CURRENT YEAR RESULT									
Profit (+)/ Loss (-)	(11,000)	(17,500)	12,000	(11,000)	(17,500)	0	0	(5,500)	0

4. Conclusions

The balance sheet of company A, that uses IFRIC 3 cost model, shows a measurement mismatch between the assets (the emission allowances) and liabilities (emission liability) because the emissions allowances are evaluated at cost while the emission liability is calculated at the fair value of the allowances required to settle it. This leads to artificial values in the balance sheet and income statement of Company A which only needed 500 extra emissions allowances valued at 5,500 c.u., yet its profit is affected by -16,500 c.u. mainly due to changes in the value of the allowances.

Company B has adopted the IFRIC 3 revaluation model. This has created a mismatch in the place where the gains and losses generated by the changes in the value of the emissions allowances are presented. Allowances revaluation gains are recognized in other comprehensive income (equity) while expenses relating to the chances in the value of the liability are recognized as income or expenses in the profit and loss account.

Company C results are closer to the effort made to cover the emission liability (the purchase of 500 extra emissions allowances at 5,500 c.u.). The main disadvantage of the "off balance sheet" method used by this company is that its balance sheet hides the company's exposure to emission allowances market and its potential emissions liability.

The absence of guidance regarding the accounting for GHGs emissions is the main reason why there is a diversity of accounting practices, which makes the financial statements of large companies, taking part in emissions trading schemes like EU ETS, difficult to compare. There are also a lot of concerns about the true and fair image and also regarding the understandability, relevance, reliability and comparability of the financial information offered by this variety of accounting models.

In a study by Lowel et. al. (2010), he established that the vast majority of the enterprises in the EU ETS scheme uses a net model (off balance sheet method) and only account for their net position. As Table 4 and 5 shows, this method provides the least amount of information on a company exposure to carbon emissions regulations and carbon markets based on its financial statements.

A variant of the off balance sheet method is officially adopted in Romania. This provides a partial fix for the issues identified with the application of IFRIC 3's recommendations, but it also suffers from the same deficiencies as the "off balance sheet" method.

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Convergence or Divergence between National and International View on Tangible Assets - Case Study Romania

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Abstract: A controversial subject at the present time is the issue of harmonization of accounting both at European level and globally. Although much has been made in bringing the accounting at a uniform level, this request it has not reached yet. A comparative study between the accounting treatment of fixed assets amounted to Romanian national regulations and in accordance with international rules, will bring out the best in show the similarities and differences between the regulations. The rules used for comparison will be OMFP 3055/2009, International Accounting Standard 16 – Tangible Assets and Generally Accepted Accounting Principles 360.

Keywords: tangible assets; comparability degree; IAS/ IFRS; national rules; Romania

JEL Classification: M40

1. Introduction

One of the main components of the company's patrimony is immobilized in capital goods and values, also called fixed assets, which are meant to provide the entity's activity for a period longer than one year and which, as a rule, is consumed incrementally. Tangible assets are a source controlled by the enterprise that are results of past events and may create future economic benefits.

The objective of this paper is to remove the need for accounting harmonization at European and global level through the removal of the similarities and differences between national rules, IAS and U. S. GAAP.

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Although there are opinions pro and contra the accounting harmonization process, we believe that viable accounting harmonization would help Romania especially during this period of economic crisis by creating transparency and accountability and by attracting new investors.

Harmonization of international accounting is the process by which rules or national rules, different from one country to another, sometimes divergent, are fine-tuned to be made comparable. Until now a quarter of a century, the accountants not only spoke and use different languages but they also gave different interpretations of the same events and transactions. Today, the main word for most accounting professionals from all over the world is the "internationalization". In fact, international accounting was born out of concerns of international harmonization of accounting rules and practices. (Bonsón et al., 2006)

The need for harmonization in accounting involves adapting and rigorously organized activities that can be assimilated to international accounting law, embodied in the goals of "accounting and control" respectively, "the normalization of accounts" (Pântea & Bodea, 2003). Providing public information constitute the expression of transparency in economic activity, its readability for internal and external users, the economic entity's creditworthiness. (Diaconu et al, 2009)

Among the arguments favoring the accounting harmonization at European and international level, we can mention:

Globalization of national economies and financial markets integration – we talk about foreign capital, relevant information for investors, intelligibility and comparability of accounting information's. Also, the need for a universal accounting language and the harmonization pressure comes from users of accounting information. The liberalization of markets requires major efforts for investors and financial analysts to understand the financial and accounting information developed by foreign companies.

The access to international capital markets promotes the harmonization of accounting. Thus, numerous intergovernmental bodies, such as the European Economic Community are concerned for the protection of investors. Other companies want to enter in the international capital markets and the developing of financial statements must be completed in such a way to correspond to the practices of the investors.

For multinational entities which have subsidiaries and branches in another country, the development, consolidation and the audit of financial statements would incur lower costs if accounting is harmonized.

Tax authorities – the complicated procedures regarding the taxation of income/ profits abroad, a result of different methodologies for determining tax bases

designed even by those authorities, find an advantage in the process of normalization of accounting (Borlea et al., 2009).

In the process of accounting harmonizing there are some obstacles that block the normalization of the accounting from the national point of view. One of these obstacles is the lack of confidence that International Accounting Standards might respond to all the changes that will occur within a country that applies them. A second major obstacle is the differences in national accounting practices that would lead to major changes in attitudes and legislation.

2. Literature Review

The literature on Romanian accounting harmonization topics claims that has not been reached the level where we can say that there are no longer differences between the accounting regulations at national and international level. We support this statement with a few arguments.

In the opinion of the accounting professionals regarding the possible implementation of IFRS in Romania it was observed that there aren't a sufficient number of specialists which can be able to implement successfully the IAS/ IFRS to all entities. (Lapteş & Palmer, 2009)

Even if International Accounting Standards have a constant evolution in terms of their application within the companies that operate in the European Union, surely there are differences between national and international regulations of some countries in the European Union, as is the case of Romania. (Turcanu et al., 2008)

Starting from the correlation that exists between the evolution of the economy and society as a whole, the implementation of International Accounting Standards are not automatically relieve the national accounting system, if do not take place profound changes in economic development policies of corporate governance mechanisms and the functioning of the financial market, at the same time (Diaconu et al., 2009). Mustata et al. (2010) say that harmonization is a spontaneous reaction to the need for harmonization of accounting practicing. The need for uniform accounting rules in small and medium enterprises using standards raise a very great interest for all accounting professionals. The aim of the European Bodies is to identify solutions regarding the harmonization of accounting practices in Europe and the quality of accounting information.

The human factor plays a key role in solving the problem of the difficulty of implementing IFRS. This aspect is not specific just to our country, not even for past Communist countries, it is a dilemma that keeps the national profession bodies in a huge pressure. There are some opinions (Albu et al., 2010) who argue that standards for accounting rules and practice will affect accounting education. This

learning problem can be solved by one solution, namely the higher education quality and the development of continuous learning professional programs.

It is strongly recommended that the paper should have an even number of pages, but no longer than 4 to 14 pages. In some cases papers with more than 14 pages will be accepted by the editorial board if they contain the report of a wider research activity which can not appear separated in two papers.

3. Methodology and Data

In this paper, the deepening of knowledge approach is made through the retrospective character imposed by normative research done, and also by prospective character, given by empirical research. From social sciences methods used within the framework of this approach, we mention: analysis of documents, the comparative method and the method of observation.

To be able to count the degree of similarities between national rules and international regulations (IAS/ IFRS), we have selected some key terms (21) considered relevant. By analyzing the content and appearance of the values of 0, 0.5 and 1, we will determine the degree of global convergence/ divergence on the item in question. Each of them will receive one point where there are the criteria and it is completely the same with at least one of the other two regulations, 0.5 points where there are common elements with at least one of the other two regulations, but there are changes in relation to the other two. Zero points will receive items which are completely different or even does not exist.

3.1. Selected Items

Definition of tangible assets - Tangible asset include, according to the current rules: land and buildings; technical installations and machinery; other installations, equipment and furniture; advances to suppliers of tangible assets and tangible assets in course of construction. (OMFP 3055/2009)

The tangible asset represents assets that are held by an entity for use in the production of goods or supply of services, to be rented to third parties or to be used for administrative purposes; they are used for a period longer than one year amounted to the category: land and buildings; technical installations and machinery; other installations, equipment and furniture; advances to suppliers of tangible assets and tangible assets in course of construction.

Definition of IAS 16 Tangible asset is consistent with the definition of national Romanian rules. There are no exclusions from the scope in terms of tangible asset headings. They are defined under IAS 16 as tangible items that are held to be used for the production or supply of goods or services, to be rented to third parties or to

be used for administrative purposes; and it is expected to be used during more than one period. (IAS 16)

The initial evaluation of fixed assets - fixed assets should be valued at its cost determined according to the rules of evaluation of national rules depending on the method of entry into the entity. (OMFP 3055/2009)

Initial recognition of a tangible, according to IAS 16, will be valued at cost. It should be recognized as active if it meets two conditions: it is likely to generate future economic benefits to the entity and the cost of assets can be reliably assessed. If the term of payment is exceeded, then the cost of the asset will be the present value of future payments. These costs will be recorded on the expenditure side.

In the case of U. S. GAAP 360 cost does not include gains or losses on fair value of cash flows resulting from the acquisition of tangible assets in foreign countries; and includes interest that is required to be capitalized at unfinished assets.

Subsequent expenses related to fixed assets - Subsequent Expenses related to tangible fixed assets shall be recognized generally as expenses in the period in which they were made. Subsequent expenditure of the tangible asset headings are capitalized only when it is probable that future economic benefits have increased beyond the previous estimate. Investments in tangible assets are capitalized and amortized leased the leasing period. (CECCAR, 2010)

There are recognized as a component of the assets, in the form of subsequent expenditures, investments made in tangible asset headings. They must have the effect of improving the technical parameters of their initial and leading to obtaining future economic benefits, in addition to those initially estimated. Obtaining benefits can either be done directly through income growth, or indirectly by reducing the cost of maintenance and operation. (OMFP 3055/2009)

As mentioned earlier, the initial assessment of the costs amounted to daily maintenance of tangible assets will not be admitted to the book value of the asset. These costs will be incurred on account of expenditure, and it will be finding in the profit and loss account. If you need to replace a part of assets, the cost of the parts replaced will be recognized in the tangible assets value, only if the criteria for recognition are met (IAS 16). According to U. S. GAAP, costs of maintenance and repairs are considered an expense that must be carried out.

Valuation at the balance sheet date amounted - in terms of valuation at the balance sheet date, the tangible asset headings shall be entered in the balance sheet at the input value reduced by accumulated value adjustments.

Depreciation of tangible assets- the depreciation cost is allocated on continued useful life of tangible assets (no requirement to deduct the residual value).

Depreciation is calculated from the month following the month in which the asset was placed in using (CECCAR, 2010). The entities use one of the following modes of depreciation:

a) Linear depreciation achieved by including a uniform expenses of fixed amounts set according to the number of years of life;

b) Depressive depreciation which consists in multiplying the linear damping rates with a coefficient, according with specific law;

c) Accelerated depreciation, which is included in the first year of operation, the operating costs of a depreciation of 50% of the value of the asset. Annual depreciation for subsequent years is calculated by linear regime, in relation to the number of years of use left.

d) Depreciation calculated per unit of product or service, where the nature justifies the use of such asset depreciation methods. (OMFP 3055/2009)

The amortization method used should reflect how the asset's future economic benefits are expected to be consumed by the entity. Depreciation of fixed assets shall be accounted for as an expense. (OMFP 3055/2009) U. S. GAAP, IAS 16 requires deployment as depreciation for the period of use of the asset, as long as the asset generates economic benefits. Depreciation stopped when the asset is qualified to be selling. As depreciation methods are: linear depreciation, depressive depreciation and depreciation by the amount of years of using period.

For the latest model of depreciation is determined primarily the amount of years by the formula:

1 + 2 + 3 + ... + (N-1) + n (n +1) x (n / 2),

And the annual depreciation is determined according to the following formula: for one (cost of acquisition, the residual value) * n / (n +1) x (n / 2) for year 2 (acquisition cost-residual value) * (n-1) / (n +1) x (n / 2) for year 3 (acquisition cost-residual value) * (n-2) / (n +1) x (n / 2), etc.

Assets exchange - In case there are exchanges of assets, this operation causes two different transactions. The first transaction is to remove from the balance of the asset given up, and the second is the recognition of the asset received in the exchange.

Items of property, plant and equipment may be acquired in exchange for non-monetary asset or assets, or by a combination of monetary and non-monetary assets (IAS 16). An exchange transaction has commercial substance if:

1. The configuration (risk, timing and amount) of the cash flows for the asset received is different from the configuration of the cash flows of the asset transferred;

2. The entity-specific value of the part of the entity's operations affected by the transaction is change as a result of the exchange;
3. The difference in (a) or (b) is significant relative to the fair value of the assets exchanged.

If an entity is able to determine reliably the fair value of either the asset received or the asset given up, then the fair value of the asset given up is used to measure the cost of the asset received unless the fair value of the asset received is clearly evident. (IAS, 16)

Exchange of non-monetary assets is recorded at fair value. However, if the transaction lacks commercial substance or for any reason cannot determine the fair value of assets or an exchange that facilitates the sale between the customers, the exchange is recognized using a deferred asset value. (U. S. GAAP)

Subsequent measurement of property - In addition to the option cost model evaluation, according to which classes of property, plant and equipment are measured at revalued amount less any accumulated amortization and any subsequent accumulated impairment losses. If revaluation increases the value, it is attributed to a "revaluation reserve" unless it represents the reversal of a revaluation losses recognized as an expense for the same asset, in which case registration will generate an income. A decrease in value will generate the recognition of an expense to the extent that exceeds the existing revaluation reserve for the same asset. The revaluation reserve is not distributable. When a revalued asset is assigned to the revaluation reserve is transferred to other reserves. Reassessment is allowed only at the end. (CECCAR, 2010)

Under IAS 16, there are two recognized models for subsequent evaluation of tangible assets: cost model and the re-evaluation model. Cost model - in this model, it is considered that an asset must be passed in accounting at the difference between its cost and accumulated depreciation and/ or accumulated impairment losses. The revaluation model - once a good has been recognized as an asset, specifically fixed asset and its fair value can be measured safely, the item will be passed in accounting at a revalued amount.

Revalue amount will be equal to its fair value determined at the date of revaluation, less any accumulated depreciation and any accumulated impairment losses until reassessment. This regular reassessment are made with regularly, to have certainty that the carrying amount is not much different from the amount that would be determined using fair value at the balance sheet date.

In the case of a tangible asset revaluation, the accumulated depreciation will be restated proportionately with the change in the gross carrying amount of the asset so the carrying amount of the asset is equal to the revalued amount. This method is

usually used when an asset is revalued by means of applying an index to determine its depreciated replacement cost.

The increase in the value of an asset, after reassessment, will be recorded in their capitals as "surplus." This increase should be recorded in the profit and loss count in the level that it is offset by a revaluation decrease of the same asset previously recognized as profit or loss. Also applies to reverse this situation, where appropriate.

Under U. S. GAAP revaluation of property is not permitted, except impairment. Depreciation adjustment recorded earlier is prohibited. Tangible entities should be reassessed to determine the market value of the asset or the current values if they are greater than the cost of the asset recorded by the entity, except in special cases such as major reorganizations.

The transfer and disposal of tangible assets - Tangible evidence will be excluded from the evidence at transfer, disposal or when their economic benefits are not expected anymore. When the item is derecognized, the gain or loss arising shall be included in profit or loss. Gains shall not be classified as revenue. The difference between the nominal amount of the consideration and the cash price equivalent is recognized as interest revenue. (IAS 16) Disposal of property, plant and equipment are subject to the same accounting treatment for U. S. GAAP as in IAS 16. Property management will be removed from the unit in which they will be sold, or when it cannot generate economic benefits.

3.2. Assessment of the Degree of Similarity between the National and International Regulations on Tangible

Based on the above theoretical approaches commensurate with the values given, we can analyze the degree of similarity between national and international regulations on tangible assets.

Table 1. Measuring the Similarity between the National and International Rules

No.	Criteria	National rules	IAS 16	US GAAP 360
1	Definition of tangible assets	1	1	1
2	Principles of recognition of fixed assets	0	1	1
3	The definition of accounting value	1	1	1
4	Definition of cost	1	1	1
5	The definition of depreciation value	0.5	1	1
6	Definition of depreciation	1	1	1
7	Definition of fair value	1	1	1
8	Definition of impairment loss	1	1	1
9	The definition of waste	0	1	1

10	Definition of discontinued operations	0	0.5	0.5
11	Initial evaluation of tangible assets	1	1	0.5
12	Subsequent expenditure on fixed assets	1	1	1
13	Evaluation of tangible assets on the balance sheet	1	1	0.5
14	Depreciation of tangible assets	1	1	1
15	Irreversible depreciation period	0.5	1	1
16	The residual value	0	1	1
17	Irreversible depreciation of intangible components	1	1	0.5
18	Assets exchange	1	1	0.5
19	Assets held for sale	0	1	1
20	Reevaluation	0	0	0
21	The transfer and disposal of tangible assets	1	1	1
TOTAL POINTS		14	19.5	17.5

Source: Author's Projection

4. Results and Discussions

After analyzing the table it can be seen that the highest score is obtained by IAS 16, as it has most in common with Romanian national regulations, respectively with U. S. GAAP 360. Thus IAS 16 is considered to be a landmark in the analysis the similitude of the other two rules. Of the total 21 points, IAS 16 get a percentage of 92.86%, this means that it contains over 90% of the criteria selected for analysis. U. S. GAAP obtain a score with two points lower than IAS 16, which means it has more in common with IAS 16 than Romanian national regulations. Thus U. S. GAAP is similar to IAS 16 with a ratio of 89.74% and holds 83.33% of the selected criteria. Romanian national regulations obtained the lowest score, 14 points from 21, which highlights the fact that significant differences are recorded to IAS 16 first, and then to U. S. GAAP. Romanian National regulations receive a share of 71.8% in the likeness of IAS 16 and 80% similarity with U.S. GAAP. Romanian regulations of holding 66.67% of criteria are selected for analysis, recording the lowest proportion.

5. Conclusions

This paper aims to highlight the need for harmonization, first in Europe, especially in countries covered by the European Union, and later the world. We tried to achieve this goal by making a comparison between the Romanian national regulations with IFRS and U. S. GAAP rules. Thus, the study came to the same

conclusion we made above: that adopting IFRS or U. S. GAAP reconciliation of their sites is almost impossible, yet in this situation would be much easier for U. S. companies to adopt IFRS than for companies in Romania. This is because U. S. GAAP is more similarities than IFRS with Romanian national regulations. However it is known that following the accession to the European Union have made great progress in accounting harmonization means, but it is not enough to say that the all accounting system from Romania is harmonized with International Financial Reporting Standards .

Why is it so necessary to harmonize accounting primarily on European and then world? To answer this question, we first noted the difference between harmonization and standardization of accounting. The processes of harmonization understand bringing the same level of national accounting standards and practices, in order to facilitate comparability of financial statements across countries. Harmonization is also part of normalization, is considered the first step towards normalizing accounts. Such accounting normalization can be defined as "the process of harmonizing the presentation of the summaries, the accounting methods and terminology." (Feleagă, 1999)

Returning to the previous question is necessary to harmonize accounting primarily to create transparency regarding accounting, accounting information can be internationally comparable, and this would have result in attracting investors needed especially in emerging countries. Why do we attract investors by accounting harmonization? Because it would be much easier for them to understand accounting if it is the same everywhere and thus achieve a cost reduction in the development, consolidation and audit financial statements.

What is the purpose of accounting normalization? Its aim is the application of the same accounting rules in European countries and beyond, and with accounting normalization aims to create uniform accounting practices. The accounting standardization imposes a single set of rules, or even a single standard to be applied in any situation.

If the accounting harmonization is intended to diminish or even eliminate differences between national regulations in different countries, the normalization you should use the same laws regarding accounts in different countries, so it is considered normalization be more difficult to implement than harmonization.

Speaking of accounting harmonization in Romania, but also in the world it has become a necessity the liberalization of financial markets and their develop because harmonization is achieved through a better allocation of financial resources, lowering transaction costs, all these are possible through transparency credibility and the ability to compare accounts of different countries. Given these, we consider harmonization at EU level and globally being started but not finished.

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Macroeconomics and Monetary Economics

The Evolution of GDP in USA Using Polynomial Regression Analysis

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Abstract: The paper deals with the problem of statistical forecasts in terms of polynomial regression. Thus, it compares actual results with predicted variables using data sets sequentially go through all the set initially.

Keywords: polynomial regression; standard deviation; GDP

JEL Classification: A11

1. Introduction

Consider, in the following, two sets of data $X=(x_i)_{i\in I}$ and $Y=(y_i)_{i\in I}$ where $I=\{1,...,n\}$. To make a choice, we assume that X is the exogenous variable and Y - endogenous. In addition, X is non-constant. We shall seek a polynomial regression function $f(x)=a_m x^m+...+a_1 x+a_0$, $x\in\mathbf{R}$ with unknown coefficients a_i, $i=0,...,m$ to be determined from the condition that:

$$\sum_{i=1}^{n}(a_m x_i^m + ... + a_1 x_i + a_0 - y_i)^2 = \text{minimum}$$

Let $F(a_m,...,a_0)=\sum_{i=1}^{n}(a_m x_i^m + ... + a_1 x_i + a_0 - y_i)^2$.

The minimum necessary condition is: $\frac{\partial F}{\partial a_k}=0$, $k=\overline{0,m}$.

We have then:

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$$2\sum_{i=1}^{n} x_i^k (a_m x_i^m + ... + a_1 x_i + a_0 - y_i) = 0,\ k=\overline{0,m}$$

from where:

$$\mathbf{a_m}\sum_{i=1}^{n} x_i^{m+k} + ... + \mathbf{a_1}\sum_{i=1}^{n} x_i^{1+k} + \mathbf{a_0}\sum_{i=1}^{n} x_i^k = \sum_{i=1}^{n} y_i x_i^k \ ,\ \mathbf{k}=\overline{0,m}$$

The resulting system has the solutions:

$$a_k = \frac{\begin{vmatrix} \sum_{i=1}^{n} x_i^m & \sum_{i=1}^{n} x_i^{m-1} & \cdots & \sum_{i=1}^{n} y_i & \cdots & n \\ \sum_{i=1}^{n} x_i^{m+1} & \sum_{i=1}^{n} x_i^m & \cdots & \sum_{i=1}^{n} x_i y_i & \cdots & \sum_{i=1}^{n} x_i \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ \sum_{i=1}^{n} x_i^{2m} & \sum_{i=1}^{n} x_i^{2m-1} & \cdots & \sum_{i=1}^{n} x_i^m y_i & \cdots & \sum_{i=1}^{n} x_i^m \end{vmatrix}}{\begin{vmatrix} \sum_{i=1}^{n} x_i^m & \sum_{i=1}^{n} x_i^{m-1} & \cdots & \sum_{i=1}^{n} x_i^k & \cdots & n \\ \sum_{i=1}^{n} x_i^{m+1} & \sum_{i=1}^{n} x_i^m & \cdots & \sum_{i=1}^{n} x_i^{k+1} & \cdots & \sum_{i=1}^{n} x_i \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ \sum_{i=1}^{n} x_i^{2m} & \sum_{i=1}^{n} x_i^{2m-1} & \cdots & \sum_{i=1}^{n} x_i^{k+m} & \cdots & \sum_{i=1}^{n} x_i^m \end{vmatrix}}, \quad \begin{matrix} \text{col.m-k+1} \\ k=\overline{0,m} \end{matrix}$$

2. The Analysis

Let consider now, the values GDP_k, $k=\overline{1,m}$ corresponding to a period of m consecutive years and the growth rate: $r_k=\frac{GDP_k - GDP_{k-1}}{GDP_{k-1}}$, $k=\overline{2,m}$.

The cyclical analysis (through the theory above) of U.S. GDP for the period 1792-2012 taking into account the growth rate does not provide acceptable results, especially in terms of the current period. For this reason, we shall consider the absolute variation of it: $v_k=\Delta r_k=r_k-r_{k-1}$, $k=\overline{3,m}$. This indicator provides more direct information on the phenomenon of crisis, meaning that $v_k<0$ indicates a decrease in the growth rate, while $v_k>0$ is equivalent to leave the crisis phenomenon.

For our analysis, we consider therefore value pairs: (k,v_k), $\overline{3,m}$ for the period 1792-2012.

Table 1. The Evolution of GDP, Growth Rate and absolute change in Growth Rate for U.S. Economy During 1792-2012

Year	GDP_k	r_k	$v_k=\Delta r_k$	Year	GDP_k	r_k	$v_k=\Delta r_k$
1792	4.58	0	0	1903	481.8	0.029	-0.0224
1793	4.95	0.0808	0.0808	1904	464.8	-0.0353	-0.0643
1794	5.6	0.1313	0.0505	1905	517.2	0.1127	0.148
1795	5.96	0.0643	-0.067	1906	538.4	0.041	-0.0717
1796	6.15	0.0319	-0.0324	1907	552.2	0.0256	-0.0154
1797	6.27	0.0195	-0.0124	1908	492.5	-0.1081	-0.1337
1798	6.54	0.0431	0.0236	1909	528.1	0.0723	0.1804
1799	7	0.0703	0.0272	1910	533.8	0.0108	-0.0615
1800	7.4	0.0571	-0.0132	1911	551.1	0.0324	0.0216
1801	7.76	0.0486	-0.0085	1912	576.9	0.0468	0.0144
1802	8	0.0309	-0.0177	1913	599.7	0.0395	-0.0073
1803	8.14	0.0175	-0.0134	1914	553.7	-0.0767	-0.1162
1804	8.45	0.0381	0.0206	1915	568.8	0.0273	0.104
1805	8.9	0.0533	0.0152	1916	647.7	0.1387	0.1114
1806	9.32	0.0472	-0.0061	1917	631.7	-0.0247	-0.1634
1807	9.33	0.0011	-0.0461	1918	688.7	0.0902	0.1149
1808	9.35	0.0021	0.001	1919	694.2	0.008	-0.0822
1809	10.07	0.077	0.0749	1920	687.7	-0.0094	-0.0174
1810	10.63	0.0556	-0.0214	1921	671.9	-0.023	-0.0136
1811	11.11	0.0452	-0.0104	1922	709.3	0.0557	0.0787
1812	11.55	0.0396	-0.0056	1923	802.6	0.1315	0.0758
1813	12.21	0.0571	0.0175	1924	827.4	0.0309	-0.1006
1814	12.72	0.0418	-0.0153	1925	846.8	0.0234	-0.0075
1815	12.82	0.0079	-0.0339	1926	902.1	0.0653	0.0419
1816	12.82	0	-0.0079	1927	910.8	0.0096	-0.0557
1817	13.12	0.0234	0.0234	1928	921.3	0.0115	0.0019
1818	13.6	0.0366	0.0132	1929	977	0.0605	0.049
1819	13.86	0.0191	-0.0175	1930	892.8	-0.0862	-0.1467
1820	14.41	0.0397	0.0206	1931	834.9	-0.0649	0.0213
1821	15.18	0.0534	0.0137	1932	725.8	-0.1307	-0.0658
1822	15.76	0.0382	-0.0152	1933	716.4	-0.013	0.1177
1823	16.33	0.0362	-0.002	1934	794.4	0.1089	0.1219

1824	17.3	0.0594	0.0232	1935	865	0.0889	-0.02
1825	18.07	0.0445	-0.0149	1936	977.9	0.1305	0.0416
1826	18.71	0.0354	-0.0091	1937	1028	0.0512	-0.0793
1827	19.29	0.031	-0.0044	1938	992.6	-0.0344	-0.0856
1828	19.55	0.0135	-0.0175	1939	1072.8	0.0808	0.1152
1829	20.3	0.0384	0.0249	1940	1166.9	0.0877	0.0069
1830	22.16	0.0916	0.0532	1941	1366.1	0.1707	0.083
1831	23.99	0.0826	-0.009	1942	1618.2	0.1845	0.0138
1832	25.61	0.0675	-0.0151	1943	1883.1	0.1637	-0.0208
1833	26.4	0.0308	-0.0367	1944	2035.2	0.0808	-0.0829
1834	26.85	0.017	-0.0138	1945	2012.4	-0.0112	-0.092
1835	28.27	0.0529	0.0359	1946	1792.2	-0.1094	-0.0982
1836	29.11	0.0297	-0.0232	1947	1776.1	-0.009	0.1004
1837	29.37	0.0089	-0.0208	1948	1854.2	0.044	0.053
1838	30.59	0.0415	0.0326	1949	1844.7	-0.0051	-0.0491
1839	31.37	0.0255	-0.016	1950	2006	0.0874	0.0925
1840	31.46	0.0029	-0.0226	1951	2161.1	0.0773	-0.0101
1841	32.17	0.0226	0.0197	1952	2243.9	0.0383	-0.039
1842	33.19	0.0317	0.0091	1953	2347.2	0.046	0.0077
1843	34.84	0.0497	0.018	1954	2332.4	-0.0063	-0.0523
1844	36.82	0.0568	0.0071	1955	2500.3	0.072	0.0783
1845	39.15	0.0633	0.0065	1956	2549.7	0.0198	-0.0522
1846	42.33	0.0812	0.0179	1957	2601.1	0.0202	0.0004
1847	45.21	0.068	-0.0132	1958	2577.6	-0.009	-0.0292
1848	46.73	0.0336	-0.0344	1959	2762.5	0.0717	0.0807
1849	47.38	0.0139	-0.0197	1960	2830.9	0.0248	-0.0469
1850	49.59	0.0466	0.0327	1961	2896.9	0.0233	-0.0015
1851	53.58	0.0805	0.0339	1962	3072.4	0.0606	0.0373
1852	59.76	0.1153	0.0348	1963	3206.7	0.0437	-0.0169
1853	64.65	0.0818	-0.0335	1964	3392.3	0.0579	0.0142
1854	66.88	0.0345	-0.0473	1965	3610.1	0.0642	0.0063
1855	69.67	0.0417	0.0072	1966	3845.3	0.0652	0.001
1856	72.47	0.0402	-0.0015	1967	3942.5	0.0253	-0.0399
1857	72.84	0.0051	-0.0351	1968	4133.4	0.0484	0.0231

1858	75.79	0.0405	0.0354	1969	4261.8	0.0311	-0.0173
1859	81.28	0.0724	0.0319	1970	4269.9	0.0019	-0.0292
1860	82.11	0.0102	-0.0622	1971	4413.3	0.0336	0.0317
1861	83.57	0.0178	0.0076	1972	4647.7	0.0531	0.0195
1862	93.95	0.1242	0.1064	1973	4917	0.0579	0.0048
1863	101.18	0.077	-0.0472	1974	4889.9	-0.0055	-0.0634
1864	102.33	0.0114	-0.0656	1975	4879.5	-0.0021	0.0034
1865	105.26	0.0286	0.0172	1976	5141.3	0.0537	0.0558
1866	100.43	-0.0459	-0.0745	1977	5377.7	0.046	-0.0077
1867	102.15	0.0171	0.063	1978	5677.6	0.0558	0.0098
1868	106.13	0.039	0.0219	1979	5855	0.0312	-0.0246
1869	109.02	0.0272	-0.0118	1980	5839	-0.0027	-0.0339
1870	112.3	0.0301	0.0029	1981	5987.2	0.0254	0.0281
1871	117.6	0.0472	0.0171	1982	5870.9	-0.0194	-0.0448
1872	127.5	0.0842	0.037	1983	6136.2	0.0452	0.0646
1873	138.3	0.0847	0.0005	1984	6577.1	0.0719	0.0267
1874	140.8	0.0181	-0.0666	1985	6849.3	0.0414	-0.0305
1875	140.6	-0.0014	-0.0195	1986	7086.5	0.0346	-0.0068
1876	146.4	0.0413	0.0427	1987	7313.3	0.032	-0.0026
1877	153.7	0.0499	0.0086	1988	7613.9	0.0411	0.0091
1878	158.6	0.0319	-0.018	1989	7885.9	0.0357	-0.0054
1879	177.1	0.1166	0.0847	1990	8033.9	0.0188	-0.0169
1880	191.8	0.083	-0.0336	1991	8015.1	-0.0023	-0.0211
1881	215.8	0.1251	0.0421	1992	8287.1	0.0339	0.0362
1882	227.3	0.0533	-0.0718	1993	8523.4	0.0285	-0.0054
1883	233.5	0.0273	-0.026	1994	8870.7	0.0407	0.0122
1884	229.7	-0.0163	-0.0436	1995	9093.7	0.0251	-0.0156
1885	230.5	0.0035	0.0198	1996	9433.9	0.0374	0.0123
1886	249.2	0.0811	0.0776	1997	9854.3	0.0446	0.0072
1887	267.3	0.0726	-0.0085	1998	10283.5	0.0436	-0.001
1888	282.7	0.0576	-0.015	1999	10779.8	0.0483	0.0047
1889	290.8	0.0287	-0.0289	2000	11226	0.0414	-0.0069
1890	319.1	0.0973	0.0686	2001	11347.2	0.0108	-0.0306
1891	322.8	0.0116	-0.0857	2002	11553	0.0181	0.0073

1892	339.3	0.0511	0.0395	2003	11840.7	0.0249	0.0068
1893	319.6	-0.0581	-0.1092	2004	12263.8	0.0357	0.0108
1894	304.5	-0.0472	0.0109	2005	12638.4	0.0305	-0.0052
1895	339.2	0.114	0.1612	2006	12976.2	0.0267	-0.0038
1896	333.6	-0.0165	-0.1305	2007	13228.9	0.0195	-0.0072
1897	348	0.0432	0.0597	2008	13161.9	-0.0051	-0.0246
1898	386.1	0.1095	0.0663	2009	12703.1	-0.0349	-0.0298
1899	412.5	0.0684	-0.0411	2010	12615	-0.0069	0.028
1900	422.8	0.025	-0.0434	2011	12982	0.0291	0.036
1901	445.3	0.0532	0.0282	2012	13351	0.0284	-0.0007
1902	468.2	0.0514	-0.0018				

* GDP-billion $-2005 US

Source: http://www.usgovernmentrevenue.com

The analysis that we perform, try to determine the best polynomial regression in forecasting purposes. Thus, for the whole data set presented, we consider, in turn, polynomial regressions of degrees 1,2 etc. determined by a variable number of data. Thus, for example, in the case of regression of order 1 (linear), we consider the first two data from the above set (v_k values in Table 1), we perform regression and we predicted for the third. We then determine regression for data 2 and 3 and we predicted for the fourth. Proceeding similarly, until finally, we then determine the standard deviation between data values (v_k) and predicted (z_k): $\sigma = \sqrt{\frac{\sum_{k=1}^{m}(z_k - v_k)^2}{m}}$ (m being the number of pairs of values).

We then proceed to determine the linear regression using sets of three, four, etc. values. Finally, we hold that type of linear regression, dependent on a specified number of previous values which lead to the smallest square deviation.

We proceed analogously with the regressions of degrees 2,3 etc.

Finally, we select the type of regression (its order) that leads to the smallest square deviation.

A problem that needs to be solved is about the exogenous variable. Because the regressions are time dependent (the year), at the high degree of regression polynomials, the prediction introduces enormous errors due to the floating point data representation in computers. For example, $2013^8 \approx 2{,}7 \cdot 10^{26}$ leading to the wrong final results (in terms of square deviation).

For this reason, we proceed as follows: if for determining a regression they are need n exogenous variable values, we shall note as follows: $-\left[\frac{n}{2}\right],-\left[\frac{n}{2}\right]+1,...,-1,0,1,...,\left[\frac{n}{2}\right]-1$ where [a] is the integer part of a number (the largest integer less than or equal to a). Prediction will be realized for x=$\left[\frac{n}{2}\right]$.

The computer analysis performed to regression of degree 7 (for higher degrees, the errors were, even with the above simplification, significant) based on a number of consecutive data between the polynomial degree and 90 revealed the following results:

Table 2

Degree	**The optimal number of values considered for the regression**	**The mean square deviation**	**The maximum absolute deviation**
1	21	0.054472841322422	0.18900
2	23	0.0557802505791187	0.20034
3	39	0.0569753758609295	0.17026
4	**76**	**0.0591226518154144**	**0.16713**
5	89	0.0661482363939285	0.19579
6	78	0.0701805725693703	0.23218
7	14	0.103008173406124	0.40049

From the data presented in Table 2, we see that with increasing the degree of polynomial regression, the mean square deviation increases. On the other hand, for a correct prediction is self-evident that at close values of the mean square deviation will be the preferred that method which will record the lowest absolute deviation (absolute difference between actual and predicted data).

From the data of Table 2, we retain therefore the polynomial regression of degree 4 which will record a maximum absolute deviation of 16.713%.

The obtained data are as follows:

Table 3

Year	v_k	Value after regression	Absolute error	Year	v_k	Value after regression	Absolute error
1868	0.021835954	-0.029389457	0.051225411	1941	0.082994323	-0.001472498	0.084466821
1869	-0.011731556	-0.039176642	0.027445087	1942	0.013831216	-0.001969281	0.015800497
1870	0.002855468	-0.00296291	0.005818378	1943	-0.020839523	-0.032963051	0.012123527
1871	0.017108791	0.024987801	0.00787901	1944	-0.082929339	-0.000478246	0.082451093
1872	0.03698866	-0.000745548	0.037734208	1945	-0.091973899	0.023027589	0.115001488
1873	0.000522209	-0.017559978	0.018082187	1946	-0.098218756	0.026328998	0.124547754
1874	-0.066629237	-0.020969539	0.045659698	1947	0.100438214	0.029595718	0.070842496
1875	-0.0194971	0.000108244	0.019605344	1948	0.052956122	0.008928651	0.044027471
1876	0.042672233	0.014805807	0.027866425	1949	-0.049096253	0.014692162	0.063788415
1877	0.00861161	0.003725049	0.004886561	1950	0.092563195	0.023861857	0.068701339
1878	-0.017983102	0.001456578	0.019439679	1951	-0.010121646	-0.021436777	0.011315131
1879	0.084765363	-0.00230045	0.087065813	1952	-0.039004224	-0.031089061	0.007915163
1880	-0.033641697	-0.020288131	0.013353565	1953	0.007722098	-0.009820952	0.01754305
1881	0.042126392	-0.002065507	0.044191899	1954	-0.052341305	-0.00984206	0.042499245
1882	-0.071840261	0.003124222	0.074964483	1955	0.078291322	-0.014006704	0.092298026
1883	-0.026013357	0.016498131	0.042511487	1956	-0.052228308	0.011129234	0.063357542
1884	-0.043550817	-0.002295812	0.041255005	1957	0.000401605	0.009680883	0.009279277
1885	0.019756894	-0.002628916	0.02238581	1958	-0.029193874	0.03253312	0.061726994
1886	0.077645179	0.023009577	0.054635602	1959	0.080768035	0.008049067	0.072718968
1887	-0.008495559	0.003923716	0.012419275	1960	-0.046973214	-0.016925268	0.030047946
1888	-0.015019255	0.0048068	0.019826055	1961	-0.001446041	-0.031496375	0.030050334
1889	-0.028960887	0.006954371	0.035915258	1962	0.037267861	-0.029118989	0.06638685
1890	0.068665463	0.020584739	0.048080723	1963	-0.016870245	-0.000667397	0.016202848
1891	-0.085722633	0.005498997	0.09122163	1964	0.01416706	0.003437747	0.010729313
1892	0.03952013	0.003881525	0.035638605	1965	0.006325411	-0.001466444	0.007791855
1893	-0.109175955	-0.011065684	0.098110271	1966	0.000946323	-0.01278169	0.013728012
1894	0.010814155	0.010209944	0.000604211	1967	-0.039872938	0.022627612	0.06250055
1895	0.161203865	0.006066574	0.155137291	1968	0.023143441	-0.005876652	0.029020093
1896	-0.130466741	-0.029273567	0.101193174	1969	-0.017357038	0.007767687	0.025124724
1897	0.059674902	0.001058407	0.058616495	1970	-0.02916341	-0.041607971	0.012444562
1898	0.066317291	-0.003537867	0.069855158	1971	0.031683319	-	0.075552289

						0.043868969	
1899	-0.04110669	-0.017185586	0.023921104	1972	0.019528259	0.020059873	0.000531614
1900	-0.043406371	-0.007911641	0.035494731	1973	0.004830455	-0.039194412	0.044024867
1901	0.028246954	0.010486345	0.017760609	1974	-0.063454129	-0.014985302	0.048468827
1902	-0.001790646	0.000250008	0.002040654	1975	0.003384658	0.028272521	0.024887863
1903	-0.022378589	-0.002813195	0.019565394	1976	0.055779871	0.013083313	0.042696558
1904	-0.064331766	-0.002285833	0.062045933	1977	-0.00767245	-0.01328864	0.005616191
1905	0.148021011	-0.005328688	0.153349699	1978	0.009786747	0.003693754	0.006092993
1906	-0.071746715	-0.020583042	0.051163673	1979	-0.024521739	0.006225027	0.030746766
1907	-0.015358445	0.019853508	0.035211953	1980	-0.033978304	0.003485774	0.037464078
1908	-0.133744503	0.022787926	0.156532429	1981	0.028113765	-0.023459044	0.05157281
1909	0.180397266	0.036114604	0.144282662	1982	-0.044805831	0.038136282	0.082942113
1910	-0.061490854	-0.011537719	0.049953135	1983	0.064613756	0.018697466	0.04591629
1911	0.021615732	-0.007513813	0.029129544	1984	0.026663303	0.002912055	0.023751248
1912	0.014406318	0.004431493	0.009974825	1985	-0.030466265	-0.064282533	0.033816267
1913	-0.007293879	-0.006478486	0.000815393	1986	-0.006754745	0.018444128	0.025198873
1914	-0.1162266	-0.015247254	0.100979346	1987	-0.002626761	-0.004950432	0.002323671
1915	0.103976105	0.013123695	0.09085241	1988	0.00909868	0.00516744	0.00393124
1916	0.111441995	-0.015228237	0.126670232	1989	-0.005379059	0.012460079	0.017839139
1917	-0.163415875	-0.041695241	0.121720634	1990	-0.016956462	0.013164594	0.030121056
1918	0.1149355	-0.007647242	0.122582742	1991	-0.021107758	-0.040544853	0.019437095
1919	-0.082246645	-0.024593016	0.057653629	1992	0.03627603	0.001195181	0.035080849
1920	-0.017349357	-0.002922589	0.014426768	1993	-0.005421749	0.049745409	0.055167158
1921	-0.013611839	0.000801309	0.014413147	1994	0.012232454	-0.017772354	0.030004808
1922	0.07863818	0.003621436	0.075016743	1995	-0.01560771	0.032739086	0.048346796
1923	0.075875091	0.000886806	0.074988285	1996	0.012271574	0.002259354	0.010012221
1924	-0.10063856	-0.008812022	0.091826538	1997	0.007152179	-0.009919979	0.017072158
1925	-0.007452634	-0.003192149	0.004260485	1998	-0.001008104	-0.021209445	0.020201341
1926	0.041857734	-0.013999625	0.055857359	1999	0.004707188	0.012977006	0.008269818
1927	-0.055660513	-0.007870621	0.047789892	2000	-0.006869545	0.05392647	0.060796015
1928	0.001884163	0.017742509	0.015858346	2001	-0.030595868	0.017637887	0.048233755
1929	0.048929722	0.036676308	0.012253413	2002	0.007340267	0.019134697	0.011794429
1930	-0.146640239	0.020491786	0.167132025	2003	0.00676599	0.037436515	0.030670525

1931	0.02133004	0.022373108	0.001043068	2004	0.010830062	0.012660172	0.00183011
1932	-0.065822182	0.014613475	0.080435657	2005	-0.005187503	0.010279317	0.01546682
1933	0.117723106	0.016915213	0.100807893	2006	-0.003817115	0.034260352	0.038077467
1934	0.121828948	-0.024700048	0.146528996	2007	-0.007253953	-0.034776413	0.02752246
1935	-0.020005617	-0.026319802	0.006314185	2008	-0.024538783	-0.037417431	0.012878648
1936	0.041648126	0.000778406	0.040869721	2009	-0.02979352	-0.081155704	0.051362184
1937	-0.079287999	-0.025648493	0.053639506	2010	0.027922874	-0.043412036	0.07133491
1938	-0.08566803	-0.007070236	0.078597794	2011	0.036027665	-0.000290385	0.036318051
1939	0.115233702	0.055907721	0.059325981	2012	-0.000668379	-0.01257802	0.011909642
1940	0.006916488	0.023154258	0.01623777				

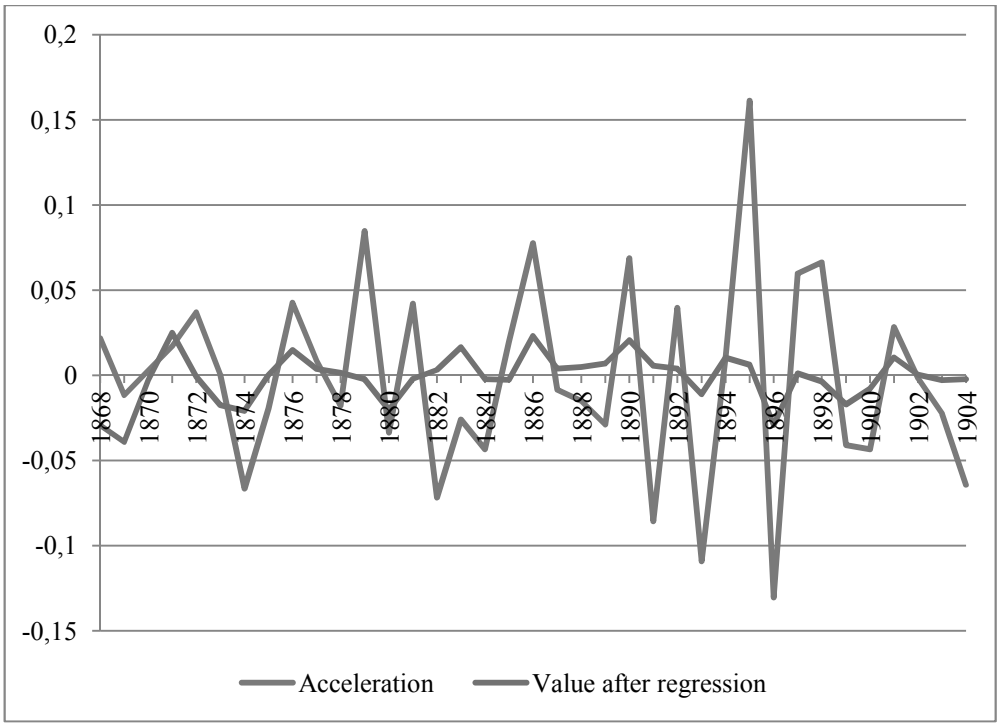

Figure 1. Forecasting the growth acceleration using polynomial regressions of degree 4 during 1868-1904

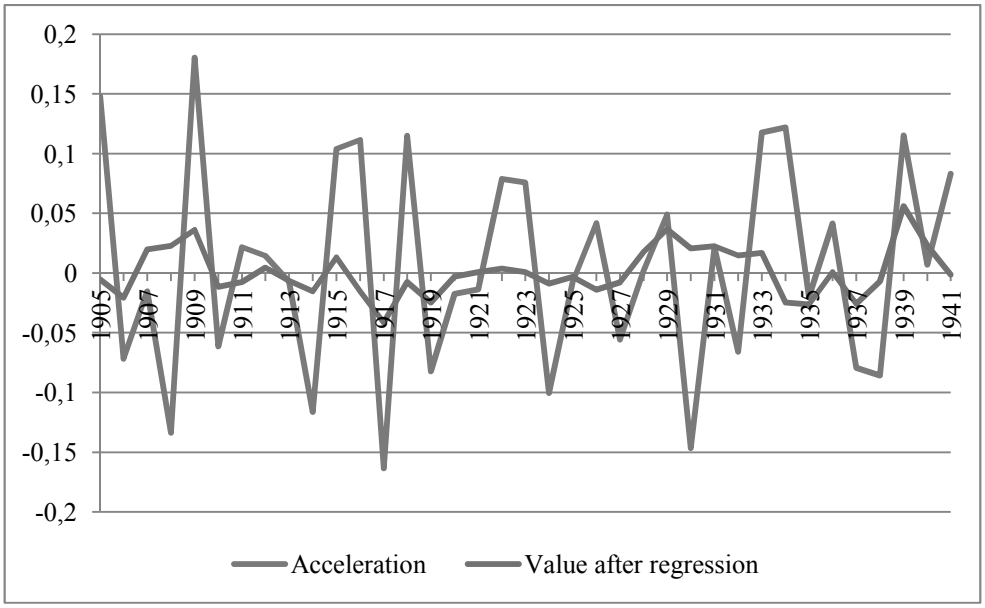

Figure 2. Forecasting the growth acceleration using polynomial regressions of degree 4 during 1905-1941

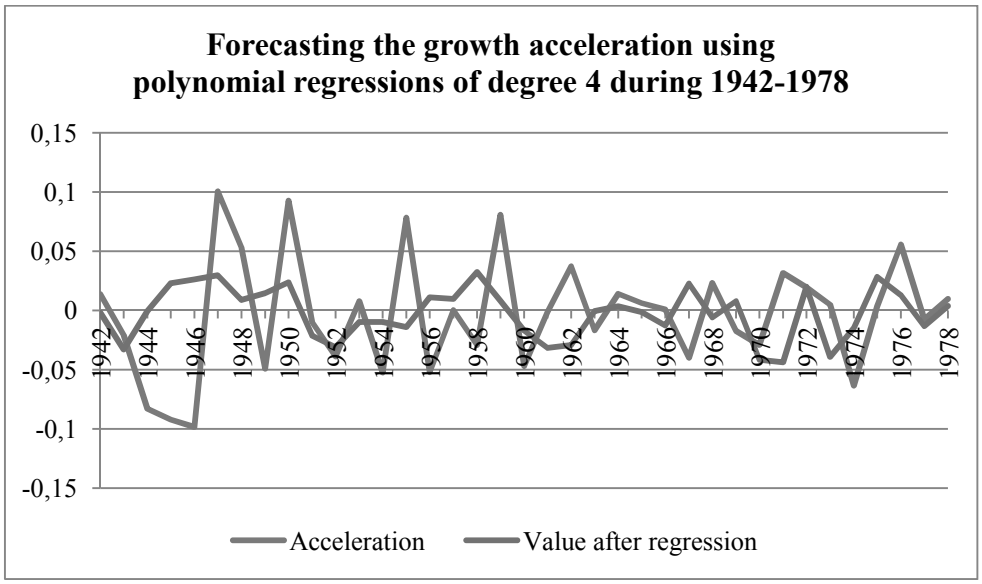

Figure 3. Forecasting the growth acceleration using polynomial regressions of degree 4 during 1942-1978

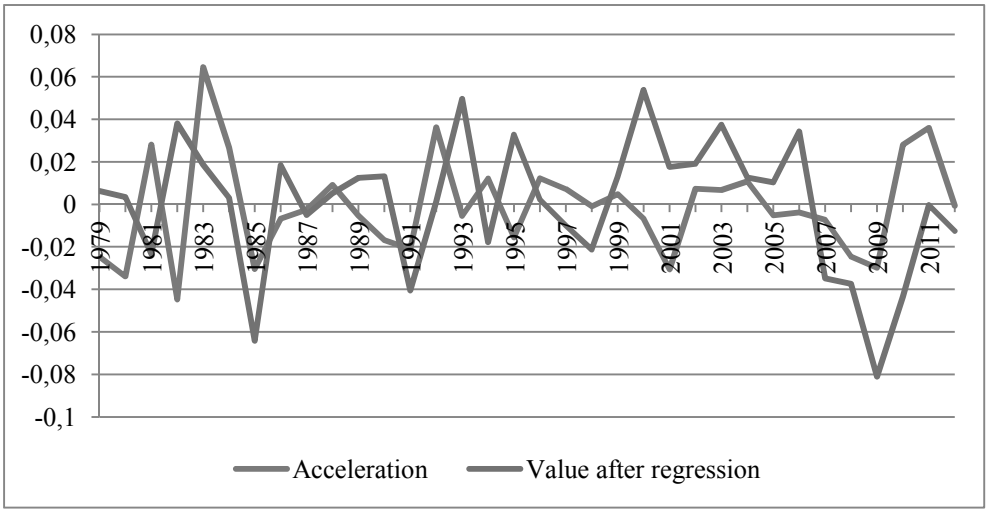

Figure 4. Forecasting the growth acceleration using polynomial regressions of degree 4 during 1979-2012

Naturally, we can put the question, of the apparent ineffectiveness of the method in the presence of such errors. On the other hand, the distribution of errors, have the following values:

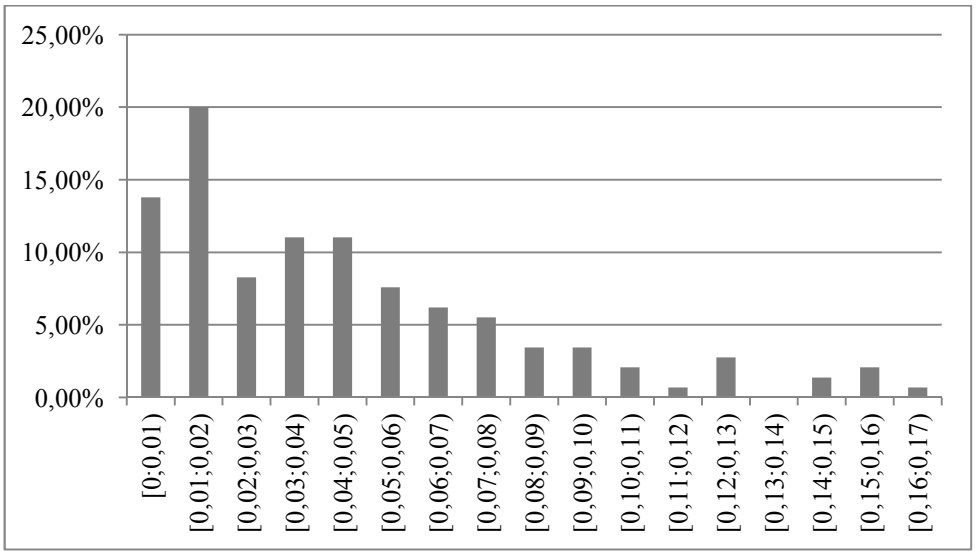

Figure 5. Distribution of Error Intervals in Total Forecasting

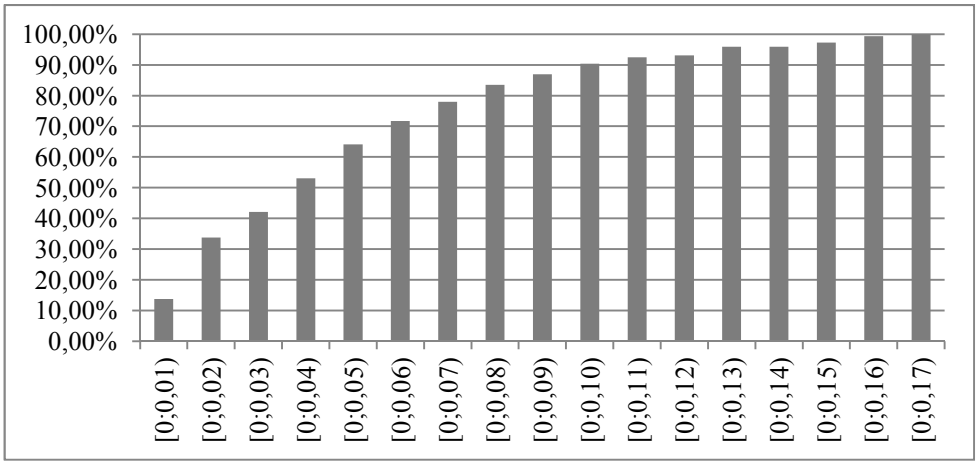

Figure 6. The Cumulative Distribution of Error Intervals in Total Forecasting

It is observed in Figures 5 and 6, that more than 50% (i.e. 53.1%) of the forecasts have absolute errors less than 4%, 33.79% having absolute error less than 2%. It also should be noted that the absolute error can be at low levels, but the direction of the prediction to be opposite (in the sense that an increase/ decrease in the real can be predicted to decrease/ increase). From Table 3 it follows, however, that 57.24% of the predictions are correct, which is somewhat reasonable. Based on this method, we intend to determine the expected value of the USA's GDP in 2013. Considering the data for the period 1937-2012 (76 consecutive records) it is obtained an estimate of v_k for 2013 of 0.002884. How $v_k=\Delta r_k$ we have:

$r_{2013}=r_{2012}+v_{2013}=0.0284+0, 002884=0, 031284=3, 13\%$

Data from economywatch.com, evaluate an increase of 2.72% which confirms the correctness of our analysis.

3. Conclusions

The above analysis suggests a comparison between different types of polynomial regression, in the direction of the best determination, both in terms of least square and maximum absolute error between the actual and forecasted data.

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Analysis of Central Banks Transparency in Countries on the Road to the European Single Currency

Iulian Vasile Popescu[1]

Abstract: This paper aims at analyzing the developments of the last decade and a half of monetary policy transparency followed by the central banks (CBs) in Central and Eastern European countries on the road to the euro adoption and to compare the results with those identified in the case of the European Central Bank (ECB). We approached the transparency level from the perspective of monetary policy strategies they use. The main results indicate increasing transparency within the considered timeframe for all monetary authorities subject to analysis, regardless of their monetary policy strategy, a higher level of transparency in the case of CBs applying a strategy of inflation targeting (IT) compared to those using the exchange rate as nominal anchor; a similar degree of transparency of the ECB and monetary authorities targeting inflation; the existence of a high degree of transparency, low inflation and stronger economic development in CEE states where the CBs target inflation compared to monetary authorities that are geared towards exchange rate targeting.

Keywords: CB governance framework; inflation targeting; exchange rate targeting; Central and Eastern Europe

JEL Classification: E50; E52; E58

1. Introduction

Alongside independence and democratic accountability, transparency of central banks in conducting monetary policy appears to be the third pillar of the monetary authorities' governance framework.

The present paper traces the recent evolutions of the monetary policy transparency degree implemented by central banks in Central and Eastern European countries following a process of convergence towards the euro area, with emphasis on the monetary policy strategies they use. The analysis includes the Czech Republic, Poland, Romania, Hungary (countries where the central banks apply a strategy of inflation targeting), Bulgaria, Latvia, Lithuania (countries where monetary authorities approach the exchange rate as nominal anchor) and the ECB (with its

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distinctive monetary policy strategy based on two pillars). In this regard, the transparency of selected central banks' monetary policy is calibrated by the index built by Eijffinger and Geraats (2006).

Over the last two decades, we note the considerable effort of central banks to increase the transparency of monetary policy, seen as a situation absent of asymmetric information in terms of monetary policy making (Geraats, 2002). This trend manifests due to the benefits of a high degree of transparency, benefits that can be addressed from two perspectives, political and economic. Thus, if from a political standpoint, the transparency of monetary policy appears as an indispensable attribute of central banks accountability (Ortiz, 2009), increased transparency generates a number of obvious advantages including on economic line: diminished inflation and the anchoring of inflationary expectations, credibility, reputation and predictability of central banks (Minegishi and Cournede, 2009).

Especially important for the measuring of CBs transparency is the Geraats (2002) - Eijfinger and Geraats (2006) - Dincer and Eichengreen (2007, 2009) - Siklos (2010) sequence of works, as it provides a specific multidimensional index, a comprehensive database and a common analysis methodology. Geraats (2002) highlighted the central bank transparency components, Eijffinger and Geraats (2006) provided systematic evidence of increased central bank transparency, Dincer and Eichengreen (2009) offered the most comprehensive set of data on banks' transparency emphasizing the upward transparency trend at a global level, Geraats (2009) used their laborious dataset and analyzed the development of transparency with focus on different types of monetary policy strategy followed by central banks, while Siklos (2010) reached an important conclusion for the present approach, showing that unlike other regions, the CBs in Central and Eastern European countries reveal during the considered time span a higher increase in the transparency degree.

The potential impact of the recent financial crisis on the transparency of monetary policy is highlighted by Csávás et al. (2011) study of all five components of Eijffinger-Geraats index. In line with political transparency, currently a major discrepancy may occur in de jure and de facto ordering of central bank objectives, which could lead to the diminishing of their transparency. In terms of the economic transparency and of implemented policy, the loss of confidence in the models used and by default in the forecasting ability of the central banks could generate a decrease in their level of transparency. As regards the procedural transparency and the policy transparency we note that in times of crises, central banks are reluctant to communicating hazards and systemic risks raised given that by doing so they may amplify turbulences. In line with the operational transparency, the involvement of unconventional monetary policy instruments may reduce the

transparency of central banks towards the objectives pursued and the explaining the decisions that motivate the use of such instruments.

2. Methodology

Given the aforementioned benefits (related to the multidimensional existence of a comprehensive database and a common methodology) for analyzing the evolution of the transparency of monetary policy implemented by central banks in the CEE countries acceding to the euro area based on the type of monetary policy strategy followed, we will use the Geraats-Eijffinger index.

This specific indicator addresses the transparency of monetary policy on five components: political transparency, economic, procedural, of the policy and operational transparency. A detailed description of the index can be found in Eijffinger and Geraats (2006). The dataset supporting the analysis is built by Dincer and Eichengreen (2009), later updated by Siklos (2010), and extended by the author until the end of 2012 in the case of selected central banks[1]. We updated the available information on the basis of data found in various documents from selected central banks websites (statute, statements on monetary policy decisions, published projections, minutes, various reports). It should also be noted that we slightly changed the datasets developed by Dincer and Eichengreen (2009) and Siklos (2010).

For obvious reasons of space, a detailed methodology for calculating the index of transparency, of specific elements that justify the award of component scores and criteria, as well as comprehensive results of measuring the degree of transparency can be obtained on request from the author.

3. Evolution of Central Banks Transparency Degree

The analysis of the transparency of central banks in CEE countries acceding to the euro area in relation to monetary policy strategies they use is summarized in Figure 1.

[1] The author expresses his gratitude to Nergiz Dincer, Barry Eichengreen and Pierre Siklos for providing databases on transparency index.

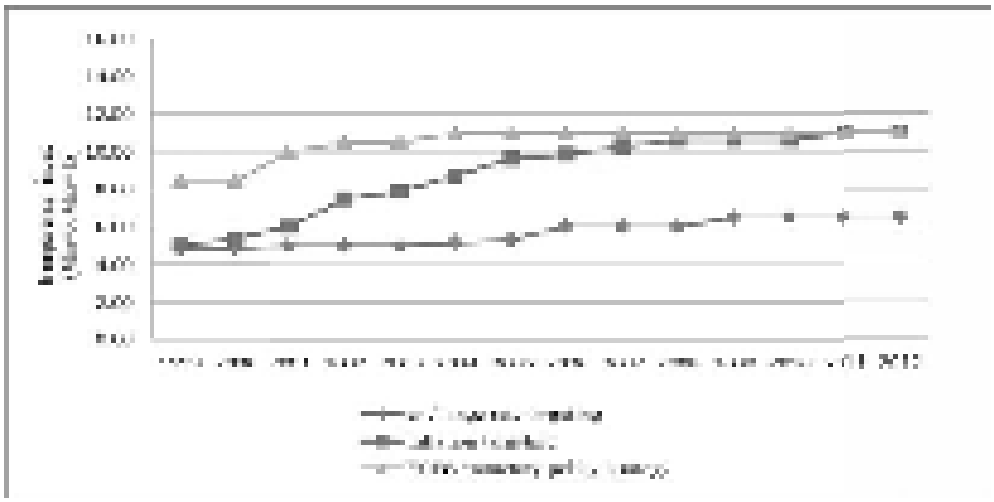


Figure 1. The Evolution of Monetary Policy Transparency Degree between 1999 and 2012

Source: Author's Calculations

Note: The classification of monetary policy strategies followed by the central banks of selected countries in 2012 according to IMF - "Annual Report on Exchange Agreements and Exchange Restrictions 2012", respectively direct inflation targeting: the Czech Republic, Poland, Romania, Hungary; exchange rate targeting: Bulgaria, Latvia, Lithuania.

The analysis results indicated a strong upward trend of monetary policy transparency in selected CEE countries, far exceeding the global average of CBs transparency levels. Monetary authorities in Central and Eastern European countries using a strategy of inflation targeting have a similar degree of transparency to the ECB, while those targeting the exchange rate display a much lower level of transparency. The differences between the two monetary policy strategies appear to be consistent with the literature, central banks using a strategy of targeting the exchange rate, as a consequence of monetary policy independence loss in the context of capital flows free movement, and explain to a lesser extent monetary policy actions. Inflation targeting presents an additional challenge as long as the objective is imperfectly controlled, with an extended and variable lag, thus requiring a higher degree of transparency.

4. The Analysis of the Current Level of Central Banks Transparency

As regards the *political transparency* (Figure 2), formally stated objectives of monetary policy can be found at a generalized level, in the context of all monetary strategies applied by the central banks of countries subject to analysis. At the same

time, an explicit ordering can be identified for monetary policy strategies of considered central banks, taking into account the primary objective of maintaining price stability. Regarding the primary objective quantification, monetary authorities that follow an IT strategy have set a numerical value for inflation, which in fact represents the its distinguishing. Although the European Central Bank does not apply an IT strategy it sets a clear quantitative definition of price stability (lower level, but close to 2%).

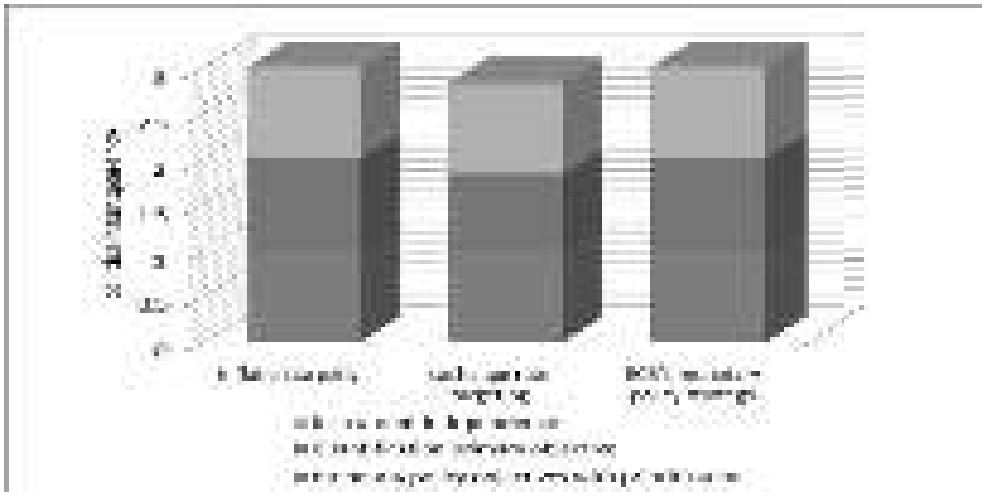


Figure 2. Political Transparency in 2012

Source: Author's Calculations

In the case of central banks using the exchange rate as nominal anchor, the target calibration is approached from a broader perspective, of revealing the presence of an intermediate target (derived from their commitment to keeping its currency fixed against the anchor). However, explicit independence on their instruments is more frequently used for inflation targeting, not in the context of exchange rate targeting (for instance, Latvia). Such a fact appears explicable as long as the lack of any discrete feature specific to exchange rate targeting strategy makes the independence on instruments less relevant.

The inclusion of *economic transparency* (Figure 3) indicates that all central banks in CEE countries committed to joining the euro area, as well as the European Central Bank publish economic data relevant to the conduct of monetary policy (money supply, inflation, GDP, unemployment). Some CBs also public estimates of the GDP gap, but given the difficulties of measuring and forecasting the potential output, such an option is practiced by only a few countries (the Czech Republic, Hungary). At the same time, if CBs subject to research pursuing a strategy of inflation targeting and the European Central Bank design quarterly numerical forecasts for inflation and GDP in the medium term, such a practice

cannot be identified in the case of all monetary authorities geared towards exchange rate targeting (e.g. Bulgaria). Since inflation forecast plays a vital role under an IT strategy, central banks' macroeconomic forecasts are often the focus of the CBs communication policy.

In addition, the use of an inflation targeting strategy implies that all selected central banks publish macroeconomic analysis and forecasting models, but from all monetary authorities that follows exchange rate targeting only the central bank of Latvia is transparent in terms of techniques it applies.

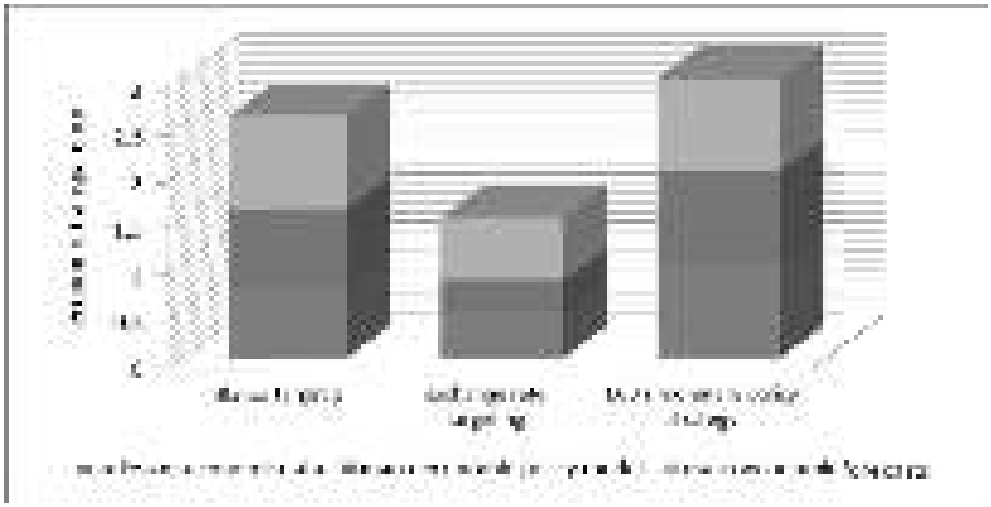


Figure 3. Economic Transparency in 2012

Source: Author's Calculations

The focus on *procedural transparency* (Figure 4) reveals that inflation targeting central banks consider especially important to describe the monetary policy framework through the explicit communication of the rule or strategy applied often explained in a didactical manner (the adjustment of the monetary policy rate is need when medium-term inflation forecasts deviates from the inflation fixed value, taking into account, in fact, the targeting of forecasted inflation). An explicit communication of the monetary strategy can be easily observed in the context of all selected central banks oriented towards the exchange rate targeting, which derives from the automatic nature of monetary policy conducting rule. However, major differences occur in the publication of minutes and individual voting of the members of monetary policy committees.

Such practices are absent both in the context of CBs using a strategy of exchange rate targeting, and of the European Central Bank. They can only be found in most CBs in the CEE region practicing IT strategies, which leads to the conclusion that

this type of monetary policy strategy is characterized by a much greater emphasis on communicating monetary policy deliberations.

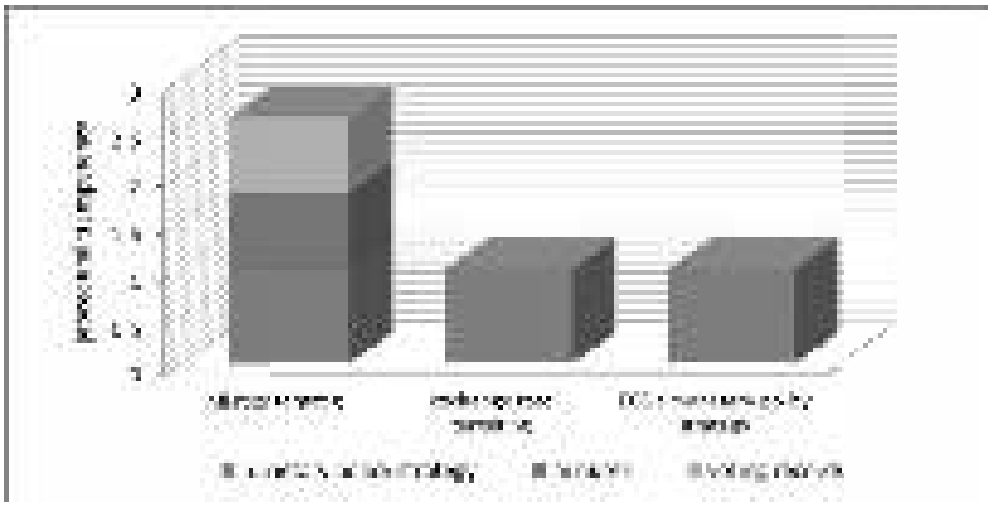


Figure 4. Procedural Transparency in 2012

Source: Author's Calculations

As regards the *transparency of implemented policy* (Figure 5), central banks in CEE countries on the road to the euro adoption that currently use an inflation targeting strategy promptly announce their decisions on the adjustments of the main instrument of monetary policy; however, in most cases the explanations are provided only in the event of changes (and/ or they are superficial).

The European Central Bank distinguishes itself by the immediately explaining of its monetary policy decisions, offering a series of forward-looking evaluations. Instead, the communication and explanation of monetary policy decisions are not identified if CBs target the exchange rate. Publication of the future direction of monetary policy or explicit indications on the most likely actions can be found only in the Czech Republic; from such a perspective CBs geared towards inflation targeting end to remain quite opaque.

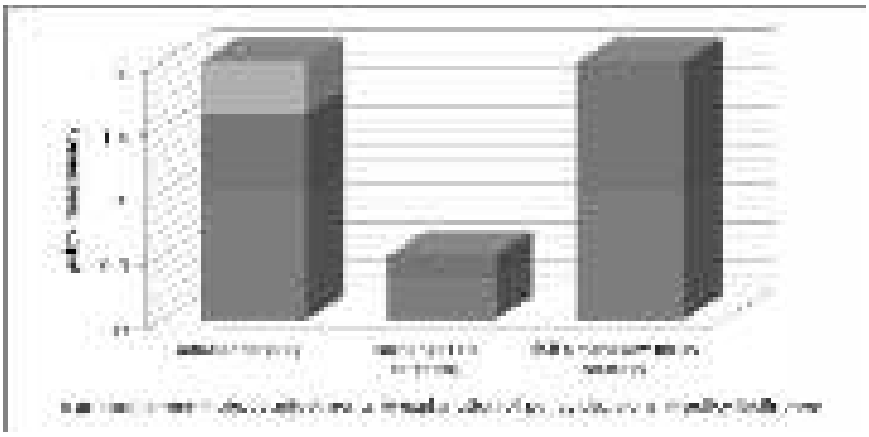


Figure 5. Policy Transparency in 2012

Source: Author's Calculations

The approach of *operational transparency* (Figure 6) indicates that the degree of openness to error control is specific to the European Central Bank and to CBs aimed at targeting inflation. From this perspective, selected central banks applying an IT strategy display high heterogeneity; however, the criterion is only partially fulfilled by Poland and Hungary and absent in the Czech Republic and Romania. The central banks position in the last two mentioned countries is similar to those targeting the exchange rate, with error control not specific to their practice. Nor the provision by the central bank of information on macroeconomic (unanticipated) shocks that affect the transmission of monetary policy appears when targeting the exchange rate.

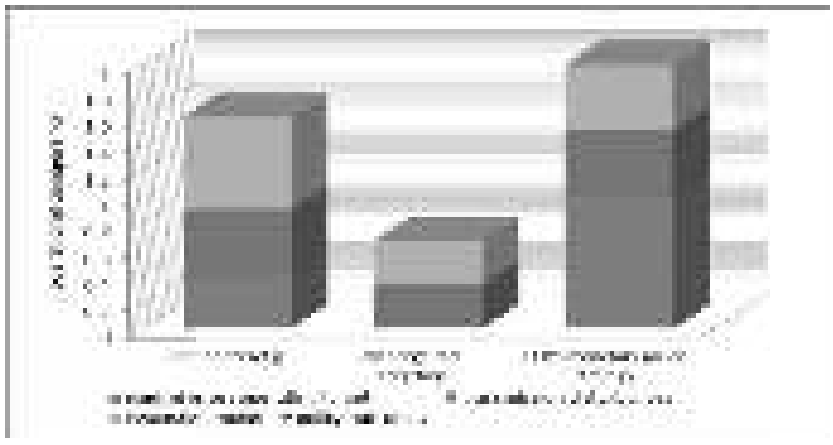


Figure 6. Operational Transparency in 2012

Source: Author's Calculations

Disclosure of information related to macroeconomic shocks affecting the transmission mechanism, drawn from the research of short-term macroeconomic developments occurs in the case of certain central banks using an IT strategy (Poland and Hungary), but the inclusion in the analysis of previous forecast errors can only be identified in the case of the European Central Bank. The evaluation of implemented monetary policy results is more visible under a strategy of inflation targeting and under the ECB's monetary policy strategy compared to the situation of CBs using the exchange rate as nominal anchor.

5. The Relation between the Transparency of Monetary Policy and Macroeconomic Performances

To identify the macroeconomic context of the evolution of monetary policy transparency of central banks in CEE countries acceding to the euro area, Table 1 shows the correlation between changes in the Eijffinger-Geraats transparency index manifested during 1999-2012, and two key macroeconomic variables, inflation and GDP per capita (logarithm, based on PPP) in 1999. The results show that the initial level of inflation is strongly positively correlated with the subsequent increase in the transparency index. Thus, it appears that a higher initial inflation leads to enhanced transparency of the monetary policy.

Table 1. The Correlation between the Initial Value of Certain Macroeconomic Variables and the Subsequent Changes of Transparency

	Inflation (1999)		Log (GDP/per capita, 1999)	
	Correlation coefficient	Probability	Correlation coefficient	Probability
Total transparency (change 1999-2012)	0,892	[0,001]	0,876	[0,000]

Source: Author's Calculations

Note: Pearson correlation coefficients and associated p-value in square brackets. Coefficients in bold are significant at 5%.

In addition, Table 1 shows that the GDP per capita is, in turn, strongly positively correlated with increased transparency, which suggests that central banks of advanced CEE economies have strengthened their monetary policy transparency.

Another relevant issue is the determination of subsequent changes in inflation as a result of the adoption of transparency. Table 2 illustrates that the level of transparency identified for the year 1999 is strongly negatively correlated with subsequent changes in inflation (as the average for the years 2000-2012). Thus, it appears that central banks in CEE countries on the road to the euro adoption have used transparency to improve their credibility and diminish inflation, which falls

within the theoretical arguments and empirical literature stating that a high degree of transparency raises the efficiency of monetary policy.

Table 2. The Correlation between the Initial Transparency Degree and Subsequent Changes in Inflation

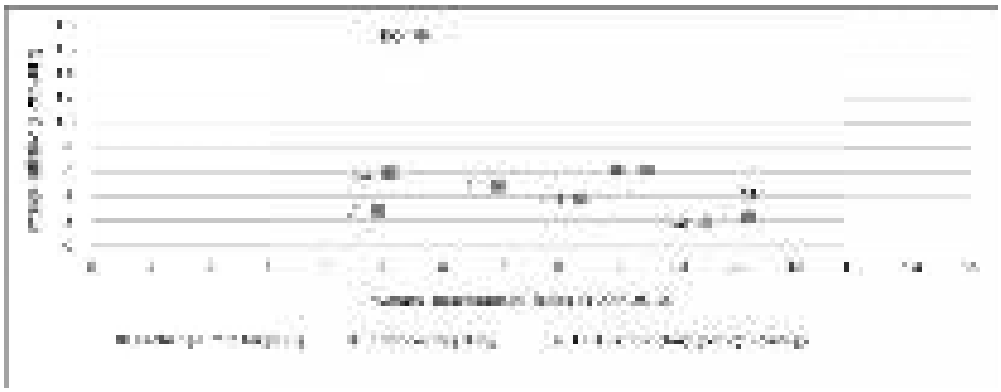
	Average inflation (2000-2012)			
	Inflation targeting + exchange rate targeting		Excluding exchange rate targeting	
	Correlation coefficient	Probability	Correlation coefficient	Probability
Total transparency (1999)	-0,737	[0,037]	-0,821	[0,049]

Source: Author's Calculations

Note: Pearson correlation coefficients and associated p-value in square brackets. Coefficients in bold are significant at 5%.

If central banks using the exchange rate as nominal anchor are excluded from the sample, the correlation between the degree of transparency and subsequent average inflation become stronger.

The result is logical if we consider that transparency has a disciplinary effect on discretionary monetary policy reducing the inflation bias and sacrifice ratio. However, this is not present under a strategy of targeting the exchange rate because in this case the central bank's commitment to maintain the exchange rate stability constraints CBs monetary policy actions, as transparency generates a less significant effect (Geraats, 2009).



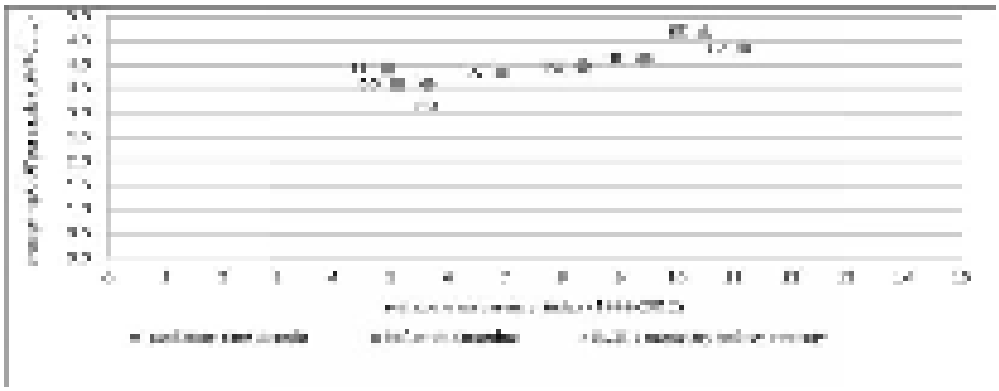


Figure 7. The Relationship between Transparency, Inflation and GDP Per Capita during 1999 – 2012

Source: Author's Calculations

The relations between transparency and inflation on the one hand and the level of transparency and real economic activity on the other hand are highlighted in Figure 7. Central banks applying exchange rate targeting strategies tend to have low levels of transparency and diminished inflation. Their commitment towards maintaining a fixed exchange rate allows for reduced inflation rates and diluted transparency. By contrast, central banks that use an inflation targeting strategy enjoy in most cases a high level of transparency corresponding to a low inflation. The ECB also reveals a high degree of transparency corresponding to depressed inflation. On the other hand, countries where the CB uses a strategy of exchange rate targeting present only limited transparency of the monetary authority and of the GDP per capita. In comparison, CEE states with CBs geared towards inflation targeting have a stronger economic development and transparency of central banks.

6. Conclusions

Analysis of recent trends in the transparency of central banks' monetary policy in Central and Eastern European countries on the road to euro adoption with emphasis on the types of strategies monetary policy uses has provided five important conclusions: *first*, increased transparency of all selected monetary authorities regardless of the monetary policy strategy; *second*, the existence of higher levels of transparency in case of monetary authorities targeting inflation compared to CBs using the exchange rate as nominal anchor, which is consistent with the anticipatory nature of inflation targeting, transparency and accountability actually representing the essential pillars of the IT strategy; *third*, a similar degree of transparency of the ECB when compared to the average of monetary authorities directly targeting inflation; *fourth*, increasing transparency positively correlated

with the initial levels of inflation and the economic development; *fifth*, the presence of a significant negative correlation between the transparency of monetary policy implemented by central banks and inflation, countries where central banks have a higher transparency tend to experience a lower level of inflation thereafter; *sixth*, the existence of a high degree of transparency, low inflation and a strong economic development altogether in countries where CB is geared towards inflation targeting compared to countries where monetary authorities uses the exchange rate as nominal anchor. Given the severe impact of the recent financial on central banks transparency levels we propose as future research direction the investigation of these implications on the five elements that define the transparency of monetary policy implemented by central banks.

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Do Budget Deficits Affect Real Interest Rates? A Test of Ricardian Equivalence Theorem

Tuan Van Nguyen[1]

Abstract: This study re-examines the Ricardian Equivalence theorem (RET) by using advanced time series econometric models to investigate updated data of the U.S. budget deficits and real interest rates. We employ a multi-model approach to thoroughly investigate the properties of two time series, namely the U.S. federal budget deficits (BDEF) and real interest rates (INTRATE) for the study period from 1798 to 2009. It is found that BDEF and INTRATE are I(0) processes. The AR (2) is the most appropriate model for the BDEF series, while the ARMA (3,2) is the proper model for the INTRATE series. The estimated VAR (2) model, comprising the two stationary series BDEF and INTRATE, implies that the BDEF series has no effect on the INTRATE series. The Granger-causality test also shows that there is no direction of causality from the BDEF series to the INTRATE series. Our findings are consistent with what the Ricardian Equivalence theorem predicts and, therefore, support the proposition that the budget deficits are neutral. This study significantly contributes to the extant literature of the relationship between the budget deficits and the real interest rates by applying the multi-model approach. Furthermore, our long time series dataset enables us to make reliable inferences.

Keywords: ARMA; VAR; Ricardian Equivalence Theorem; Budget Deficits; Interest Rates

JEL Classification: E40; C22

1. Introduction and Brief Literature Review

The Ricardian equivalence theorem (RET) implies that budget deficits are neutral. Given that the RET holds, real economic variables, such as real interest rates, will not be affected by the budget deficits (Rose & Hakes, 1995). However, the relationship between budget deficits and real interest rates, in fact, is one of the most controversial issues in macroeconomics (Aisen & Hauner, 2013; Laubach, 2009). Economics theory and empirical evidence provide inconclusive answers for this relationship (Laubach, 2009; Thomas & Danhua, 2009). For example, a recent study of Thomas and Danhua (2009), using the data of the United States (the U.S.) in the period from 1983 to 2005, shows that the relationship between budget

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deficits and real interest rates is statistically significant and economically relevant. Similarly, applying the system Generalized Method of Moments (GMM) to explore a large panel dataset from emerging economies, Aisen and Hauner (2013) conclude that budget deficits have a significantly positive impact on interest rates. Laopodis (2012, p. 547) employs vector auto-regression (VAR) and Granger causality analyses to investigate data of the United States from 1960 to 2006 and states that "budget deficits negatively affect the equity market through increases in interest rates". This implies that the Ricardian Equivalence theorem is violated. Whereas, using the Markov regime-switching model to examine data from the U.S. economy, Choi and Holmes (2011) point out that the relationship between budget deficits and real long-term interest rates switches between an insignificant relationship (Ricardian Equivalence regime) and a positive relationship (traditional viewpoint).

Following Choi and Holmes (2011); and Laopodis (2012), we investigate the relevance of the Ricardian Equivalence theorem for the nexus between the budget deficits and the real interest rates time series by using a multi-model approach. More specifically, we employ appropriate ARMA models and VAR models to investigate this relationship. We also use the Granger test to find out the nature of causality between BDEF and INTRATE. The null hypothesis in each case is that INTRATE does not 'Granger cause' BDEF and vice versa. We find that the real interest rates may not be affected by the U.S. federal budget deficits. Our finding, therefore, is consistent with what the Ricardian Equivalence theorem has predicted.

This study contributes to the extant literature of the relationship between budget deficits and the real interest rates by applying the multi-model approach. In our opinion, this approach allows us to thoroughly examine the link between the two time series. Furthermore, the technique of impulse response functions is adopted to trace out the response of the dependent variables in the VAR system to shocks in the error terms. We also apply variance decomposition technique to measure the contribution of each type of shock to the forecasted error variance of the variables in the VAR model. Finally, to the best of our knowledge, our time series data, covering a long period from 1798 to 2009, is the biggest dataset that has ever been used in the relevant literature. This facilitates using advanced econometric estimations to explore the dynamic nature of the budget deficits-real interest rates relation. A long time series dataset enables us to make reliable inferences as well.

The remainder of the paper is structured as follows. Section 2 will summarize the concept on stationarity of a time series and discuss how one can find out if a time series is stationary through its autocorrelation function. The formal tests of stationarity (augmented Dickey-Fuller test, and Phillips-Perron test) will be briefly presented. ARMA models, VAR model, and the relevant procedures of estimation will be then introduced to set the theoretical foundation of applications in the next section. The sources of data are also indicated in this section. The illustration of the above econometric procedures and their inferences, which employs annual data of

the United States for the period from 1798 to 2009, will be presented in section 3. Finally, there will be some concluding remarks as well as the implications of the results for the Ricardian Equivalence theorem.

2. Data and Methods

2.1. Data

This study uses annual data on the U.S. federal budget deficits (measured as the percentage of GDP) and the U.S. real interest rates for the study period from 1798 to 2009. These series are respectively denoted as BDEF and INTRATE. The BDEF time series are obtained from http://www.usgovernmentDEBT.us/. The nominal interest rates and price data, which are used to compute a measure of INTRATE time series, are obtained from http://measuringworth.com/datasets.html. Table 1 presents descriptive statistics of BDEF and INTRATE series. The mean value of BDEF is 1.16% while the mean value of INTRATE is 7.16%. There are 211 observations for each series. Jarque-Bera statistics of the two series show that the two series are not normally distributed

Table 1 Descriptive Statistics

	BDEF	INTRATE
Mean	1.165687	7.163307
Median	0.020000	6.217515
Maximum	28.05000	28.06066
Minimum	-4.33000	-9.349151
Std. Dev.	3.823536	6.075390
Skewness	4.165189	0.754984
Kurtosis	24.74265	4.238390
Jarque-Bera	4766.299	33.52802
Probability	0.000000	0.000000
Sum	245.9600	1511.458
Sum Sq. Dev.	3070.079	7751.176
Observations	211	211

2.2. Methods

Stationary Stochastic Processes

The important requirement of time series analysis is that the underlying time series is stationary, which implies that the distribution of the variable does not depend upon time (strictly stationary). However, in most practical situations, a weak stationary process often suffices. In short, a weak stationary time series (hereinafter referred to as the term “stationary process” or “stationary time series”) $\{Y_t\}$ is characterized by:

$$E\{Y_t\} = \mu < \infty \quad (1)$$

$$V\{Y_t\} = E\{(Y_t - \mu)^2\} = \gamma_0 < \infty \quad (2)$$

$$Cov\{Y_t, Y_{t-k}\} = E\{(Y_t - \mu)(Y_{t-k} - \mu)\} = \gamma_k$$
$$k = 1, 2, 3... \quad (3)$$

If a time series does not simultaneously satisfy the above-mentioned characteristics of (1), (2), and (3), it is called a non-stationary time series. In other words, a non-stationary time series will have a time-varying mean or a time-varying variance, or both.

Tests of Stationarity

At the informal level, the correlogram of a time series, which is a graph of autocorrelation at various lags, can be employed to check whether it is stationary or not. For stationary time series, the correlogram tapers off quickly. For non-stationary time series, it dies off gradually. For a purely random series, the autocorrelations at all lags 1 and greater are zero. At the formal level, stationarity can be identified by finding out if the time series contains a unit root. The ADF tests and Phillips-Perron test can be used for this purpose. If the time series is not stationary, difference it one or more times to obtain stationarity.

General ARMA Processes

First, we define a moving average process of order q, denoted as an MA (q) process, as the equation (4):

$$y_t = \varepsilon_t + \alpha_1 \varepsilon_{t-1} + \alpha_2 \varepsilon_{t-2} + ... + \alpha_q \varepsilon_{t-q} \quad (4)$$

An autoregressive process of order p, denoted as an AR (p), is written as the following equation (5):

$$y_t = \theta_1 y_{t-1} + \theta_2 y_{t-2} + ... + \theta_p y_{t-p} + \varepsilon_t \quad (5)$$

Where: ε_t is a white noise process which has zero mean, constant variance, and is serially uncorrelated; $y_t = Y_t - \mu$ is the demeaned series, with Y_t is the original series.

Many stochastic processes cannot be modeled as purely autoregressive or as purely moving average, since they have the qualities of both types of processes. The logical extension of the models is autoregressive moving average process of order (p,q), denoted as ARMA(p, q), and its equation is written as equation (6):

$$y_t = \theta_1 y_{t-1} + ... + \theta_p y_{t-p} + \varepsilon_t + \alpha_1 \varepsilon_{t-1} + ... + \alpha_q \varepsilon_{t-q} \quad (6)$$

The Box-Jenkins (BJ) Methodology

Having tested the stationarity of a time series, we can apply the BJ strategy to build its appropriate ARMA models. This strategy consists of three main steps as follows.

Identification: Choose the most appropriate values for p, q of tentative model. The sample autocorrelation function (SAC) and the sample partial autocorrelation function (SPAC) of the stationary process are computed to find out if the series is purely autoregressive, or purely of the moving average type, or the mixture of the two. Model AR (p) is chosen if SPAC correlogram has significant spikes through lags p and cuts off after p; and SAC correlogram dies down. Model MA (q) is chosen if SAC correlogram has significant spikes through lags q and cuts off after p; and SPAC correlogram dies down. In the absence of any of these two situations, a combined ARMA model may provide an appropriate representation of the data.

Estimation: Choose the most appropriate values for the tentative model parameters. Ordinary least square method (OLS method) is often used to estimate these parameters.

Diagnostic checking: Examine the residuals from the tentative model just estimated to find out if they are a white noise process. If they are, the tentative model is probably a good approximation to the process. If they are not, the BJ procedure will be started all over again.

Vector Autoregressive Models (VAR)

The VAR models consider several time series at a time. Here, all variables are treated as endogenous in a simultaneous system. If we have two variables, Y_t and X_t, the VAR includes two equations. The first order VAR would be given by equations (7) and (8):

$$Y_t = \delta_1 + \theta_{11} Y_{t-1} + \theta_{12} X_{t-1} + \varepsilon_{1t} \quad (7)$$

$$X_t = \delta_2 + \theta_{21} Y_{t-1} + \theta_{22} X_{t-1} + \varepsilon_{2t} \quad (8)$$

If each equation contains the same number of lagged variables in the system, OLS method can be used to estimate their parameters. However, determining the lag length is one of the practical challenges in VAR modeling. A reasonable strategy is to estimate VAR models for various lag lengths and then choose the most appropriate model on the basic of Akaike or Schwarz information criteria.

3. Results and Discussion

3.1. Tests of Stationarity of BDEF and INTRATE

Graphical Analysis

Before we conduct formal tests of stationarity, it is very helpful to get some initial impression about the likely nature of the two time series by plotting them. Figure 1 and Figure 2 show that BDEF and INTRATE series fluctuate around their means over the period of study and tend to return to their means in the long run (called mean reversion). These give an intuitive clue about the stationarity of the two series.

Correlogram and Statistical Significance of Autocorrelation Coefficients

The correlogram up to 20 lags of the BDEF series (Figure 3) shows that its autocorrelations decline rapidly as the lags increase (we are 95% confident that the true autocorrelation coefficients (ACs) from lag 4 onward are zero, except the ACs at lags 1, 2 and 3). This, once again, reinforces our feel from previous subsection that the BDEF series may be stationary.

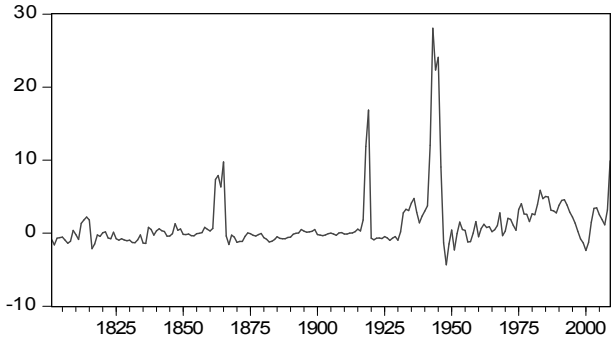

Figure 1. The Time Series BDEF (1798-2009)

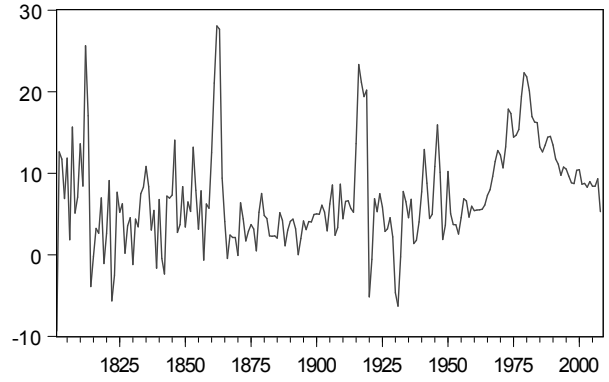

Figure 2. The Time Series INTRATE (1798-2009)

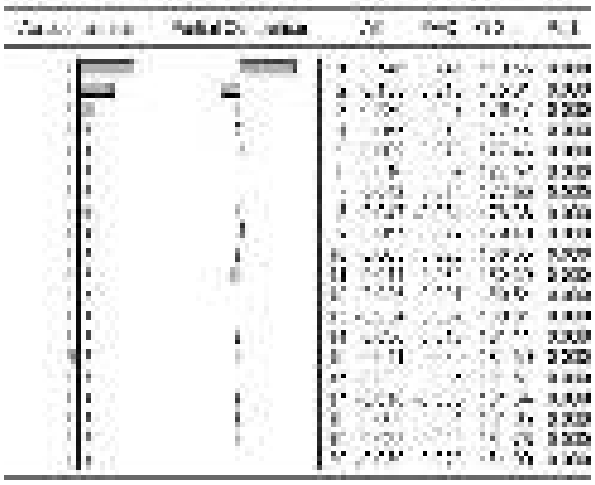

Figure 3. Correlogram of the Time Series: BDEF

Figure 4 depicts the correlogram up to 20 lags of INTRATE time series that gives us an unclear impression of the stationarity. The SACs decay to zero quite slowly and have significant peaks up to lag 10 (at the 5% level).

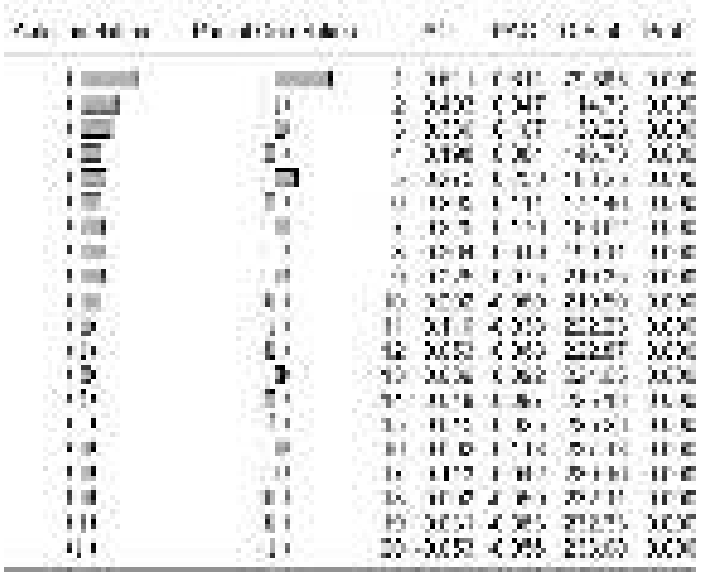

Figure 4. Correlogram of the Time Series: INTRATE

The Augmented Dickey-Fuller Test (ADF Test)

In this subsection, we test the presence of unit root in BDEF and INTRATE time series by the ADF procedure. On the basis of the above graphical analysis, the

"trend" term will be excluded from the ADF test equations of BDEF and INTRATE series. The test results are respectively given in Table 2 and Table 3.

Table 2. ADF Unit Root Test on BDEF

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.265051	0.0000
Test critical values:	1% level	-3.461478	
	5% level	-2.875128	
	10% level	-2.57409	

Note: *MacKinnon (1996) one-sided p-values.
Null Hypothesis: BDEF has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=14)

Table 2 presents ADF unit root test on BDEF series. The *t* value of $BDEF_{t-1}$ coefficient is -6.265 which (in absolute terms) is much larger than even the 1% critical *t* value of -3.461. Hence, the null hypothesis that the time series has a unit root is rejected at 1% significant level. This means the BDEF series is stationary. ADF unit root test on INTRATE series is given in Table 3. The ADF test statistic -7.08 is so large in absolute terms that the null hypothesis cannot be accepted at any conventional levels of significant (Table 3). The conclusion is that the INTRATE series is stationary.

Table 3. ADF Unit Root Test on INTRATE

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.084427	0.0000
Test critical values:	1% level	-3.461478	
	5% level	-2.875128	
	10% level	-2.57409	

Note: *MacKinnon (1996) one-sided p-values.
Null Hypothesis: BDEF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=14)

The Phillips-Perron Test

The Phillips-Perron unit root tests presented in Table 4 give us similar awareness about the stationarity of BDEF and INTRAT time series to the results from the ADF tests. The null hypothesis that the BDEF time series has a unit root is rejected at 1% level (Phillips-Perron test statistic = -4.748, *p*-value = 0.0001). Similarly, the null hypothesis that the INTRATE time series has a unit root is also rejected at 1% level (Phillips-Perron test statistic = -7.106, *p*-value = 0.0000). Then both BDEF and INTRATE are said to be I(0) processes.

The results from the Augmented Dickey-Fuller test and the Phillips-Perron test imply that BDEF and INTRATE series have limited memories of their past

behavior. The impacts of a particular random shock, which may be due to policy interventions, on such time series are temporary. It must be mentioned, however, that although INTRATE time series is stationary and its correlogram (Figure 4) provides us with an ambiguous impression of the stationarity. We can see that even with stationarity, it takes a quite long period for INTRATE series to return to its long run average.

Table 4. Phillips-Perron Unit Root Test on BDEF and INTRATE

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic for BDEF		-4.748796	0.0001
Phillips-Perron test statistic for INTRATE		-7.105677	0.0000
Test critical values:	1% level	-3.461327	
	5% level	-2.875062	
	10% level	-2.574054	

Note: *MacKinnon (1996) one-sided p-values.

3.2. Estimate Appropriate ARMA Models for BDEF and INTRATE

We have noted that the BDEF and INTRATE processes (in level form) are stationary. We can now apply the ARMA (p, q) model to them.

ARMA Model for BDEF

From Figure 3, two facts stand out: (1) the SACs decline up to lag 3, then the rest of them is statistically not different from zero; and (2) SPACs drop dramatically and all SPACs after the second lag are statistically insignificant. This suggests that MA (3); or AR (2); or ARMA (2, 3) may be tentative models. These three models were estimated by OLS method (the detail results are not reported). For AR (2) model, we obtain the equation (9) as follows:

$$bdef_t = 1.309 + 0.96bdef_{t-1} - 0.258bdef_{t-2} + \hat{\varepsilon}_t$$

(2.286) (14.012) (-3.772)

R^2=0.59 d=1.98

AIC=4.66 F = 153.77 (9)

The equation (9) shows that all of model's parameters are statistically significant. The *F*-value =153.77 is so high that we can reject the null hypothesis that collectively all the lagged terms are statistically insignificant. We also see AR (2) model provides a slightly better fit than the others, which is confirmed by the smallest value of the Akaike information criterion (AIC = 4.66). The adjusted R-squared of the regression is 0.59, implying that equation (9) can explain about 59%

of the movement of BDEF series while the remaining 41% is explained by other factors.

The estimated SACs and SPACs of residuals from equation (9) are given in Figure 5. This figure shows that none of the auto-correlations and partial auto-correlations is individually statistically significant. Moreover, as we can see from the last column of Figure 5, the *p*-value of the LB statistic up to lag 36 is larger than 5%. Thus, the null hypothesis that the sum of 36-squared ACs is zero cannot be rejected. This suggests that the series of residuals estimated from equation (9) is a white noise process. Hence, the above AR (2) may be the most appropriate model for BDEF series.

ARMA Model for INTRATE

A similar procedure of estimation (with the technical assistance of add-ins 'Automatic ARIMA selection' on EVIEWS 7.1) is applied for the INTRATE time series. The ARMA (3, 2) model for INTRATE series is shown in Table 5. Based on the AIC =5.80, this model is preferred to others (the detail results of the other models are not reported). The correlogram of the residuals obtained from ARMA (3,2) for INTRATE (unreported to save space) gives the impression that the residuals correspond to a white noise process. If the ARMA (3, 2) is accepted as the most appropriate estimation, it will be able to explain about 49% the behavior of the INTRATE series.

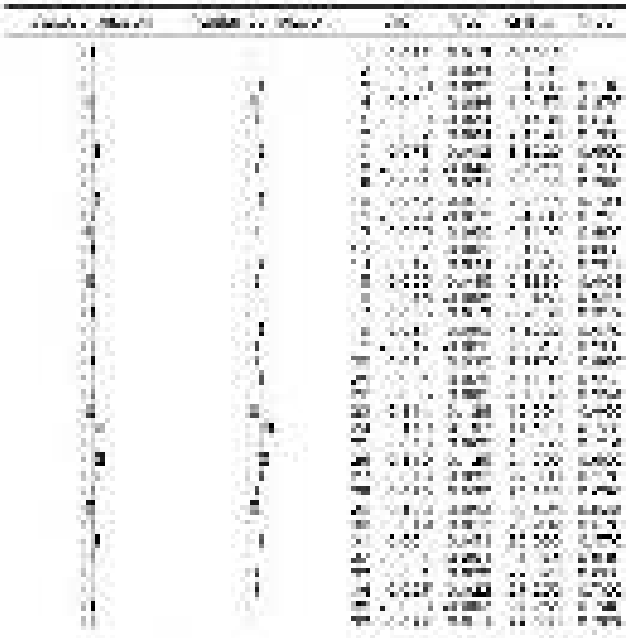

Figure 5. Correlogram of the Residuals Obtained from AR(2) Model for BDEF

Table 5. ARMA (3,2) Model for INTRATE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.186804	0.976407	7.360462	0
AR(1)	-0.667808	0.099515	-6.710632	0
AR(2)	0.184886	0.079036	2.339266	0.0203
AR(3)	0.532881	0.061353	8.685557	0
MA(1)	1.395079	0.105177	13.26406	0
MA(2)	0.685288	0.094367	7.261936	0
R-squared	0.506713	Mean dependent var		7.12311
Adj. R-squared	0.494503	S.D. dependent var		6.10916
F-statistic	41.49961	Durbin-Watson stat		1.93599
Prob(F-statistic)	0			

3.3. VAR Model for BDEF and INTRATE Time Series

The Empirical VAR Model

In this section, we will consider a bivariate VAR model comprising two stationary series BDEF and INTRATE. This model explains current BDEF in terms of lagged INTRATE and lagged BDEF, and current INTRATE in terms of lagged INTRATE and lagged BDEF. We assume that each equation contains p lag values of BDEF and INTRATE, which will be selected on the basis of the smallest value of the FPE, AIC, SC or HQ criteria. As presented in Table 6, we find that p = 2 is the appropriate lag order determined by the SC and HQ criteria.

Table 6. Selections of the VAR Lag Length

Lag	FPE	AIC	SC	HQ
0	501.0583	11.89248	11.92512	11.90568
1	132.2747	10.56063	10.65856	10.60025
2	122.7958	10.48626	10.64947*	10.55229*
3	122.9690	10.48763	10.71613	10.58007
4	124.7741	10.50214	10.79592	10.62100
5	118.5174	10.45060	10.80967	10.59587
6	117.5714	10.44245	10.86680	10.61412
7	114.6191*	10.41683*	10.90647	10.61492
8	117.9504	10.44523	11.00015	10.66973

Note: * indicates lag order selected by the criterion

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

We obtain the estimated parameters of the two equations given in Table 7. First, consider the BDEF regression. Most coefficients are statistically significant except INTRATE at lag 1 and intercept coefficient. However, the *F*-value = 84.58 is large enough to reject the null hypothesis that the various lagged coefficients simultaneously equal to zero. Second, for the INTRATE regression, we can see that the coefficients of BDEF at lag 1 and 2, and INTRATE at lag 2 are not statistically significant, but collectively, they are significant on the basis of the standard *F* test. (*F*-statistic = 30.63). However, the adjusted R-squared of this regression is low (~ 36.29%). Both these imply that BDEF may have no effect on INTRATE.

We conducted autocorrelation LM test for the residuals obtained from the above-mentioned VAR (2) model to test whether or not there is serial correlation. The null hypothesis that there is no serial correlation is accepted at almost lag orders suggesting that there is no serial correlation in the residual series (presented in Table 8).

Table 7. A Standard VAR (2) Model Comprising BDEF and INTRATE

	BDEF	INTRATE
BDEF(-1)	0.924840	0.048694
	[13.5620]	[0.34901]
BDEF(-2)	-0.278194	-0.054921
	[-4.13805]	[-0.39929]
INTRATE(-1)	-0.009237	0.576817
	[-0.26400]	[8.05768]
INTRATE(-2)	0.101921	0.050860
	[2.89415]	[0.70589]
C	-0.241804	2.646330
	[-0.88659]	[4.74247]
R-squared	0.623842	0.375215
Adj. R-squared	0.616466	0.362965
Sum sq. resides	1154.066	4830.929
S.E. equation	2.378484	4.866315
F-statistic	84.58137	30.62812

Note: t-statistics are presented in [ ]

Table 8 Autocorrelation LM Test for the Residuals Obtained from the VAR(2)

Lags	LM-Stat	Prob
1	3.513770	0.4758
2	6.806446	0.1465
3	3.575570	0.4665
4	9.398860	0.0519
5	18.89568	0.0008
6	0.376483	0.9844
7	1.229621	0.8732
8	7.861581	0.0968
9	2.508513	0.6431
10	5.431874	0.2458
11	1.518727	0.8233
12	1.580891	0.8122

Note: Probes from chi-square with 4 degree of freedom.

Granger-Causality Tests

Damodar (2004, p. 22) notes that "[…] although regression analysis deals with the dependence of one variable on other variables, it does not necessarily imply causation. In other words, the existence of a relationship between variables does not prove causality or the direction of influence". Thus, in this subsection, we will use the Granger test to find out the nature of causality between BDEF and INTRATE. The null hypothesis in each case is that INTRATE does not 'Granger cause' BDEF and vice versa. It is important to note that the term 'causes' in 'Granger causes' does not mean contemporaneous causality between the two variables. Granger causality implies a relationship between the current value of one variable and the lagged values of other ones.

Table 9. Granger Causality Test

Dependent variable: BDEF			
Excluded	Chi-sq	df	Prob.
INTRATE	11.43328	2	0.0033
All	11.43328	2	0.0033
Dependent variable: INTRATE			
Excluded	Chi-sq	df	Prob.
BDEF	0.165668	2	0.9205
All	0.165668	2	0.9205

The results given in Table 9 show that the direction of causality is from INTRATE to BDEF (INTRATE 'Granger causes' BDEF). Meanwhile, there is insufficient information in the data to reject the null hypothesis that BDEF does not "Granger cause" INTRATE. This is another way to say that there is no direction of causality from BDEF to INTRATE.

Analyzing the Impulse Responses and Variance Decompositions

The impulse response functions (IRFs) trace out the response of the dependent variables in the VAR system to shocks in the error terms, while the variance decompositions measure the contribution of each type of shock to the forecast error variance of the variables in the VAR model (Damodar, 2004; Verbeek, 2004). The results of IRFs appear in four figures form Figure 6 to Figure 9.

Figure 6 and Figure 7 depict the response in BDEF series and INTRATE series to a shock in them, respectively. We can see shocks are not persistent and their effects eventually die out because these series are stationary.

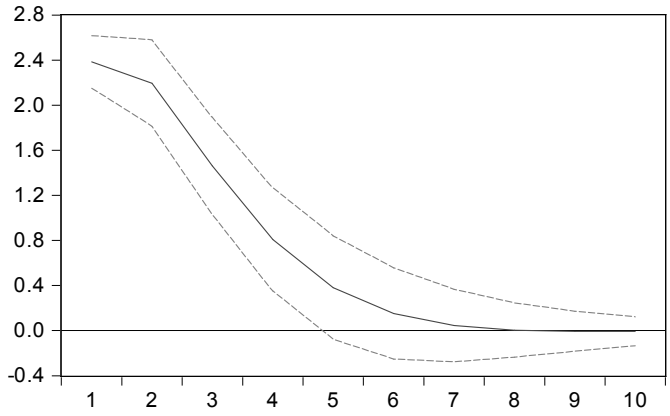

Figure 6. Impulse-Response Analysis: Response of BDEF to BDEF

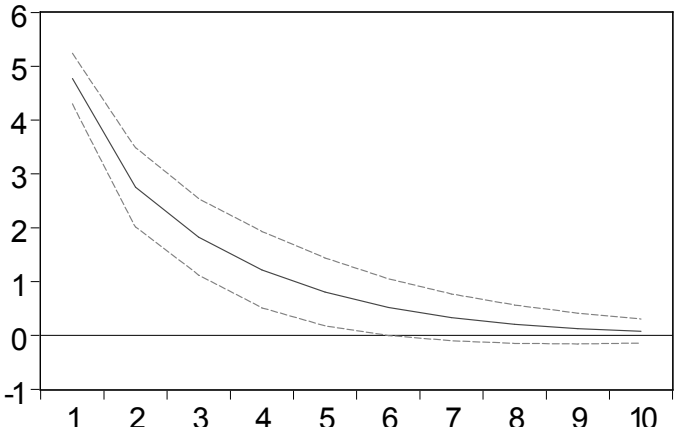

Figure 7. Impulse-Response Analysis: Response of INTRATE to INTRATE

Figure 8 shows that BDEF is generally higher after the INTRATE increases, reaching a maximum of nearly 0.7% points higher in year 5. Then the response in BDEF series gradually converges to zero.

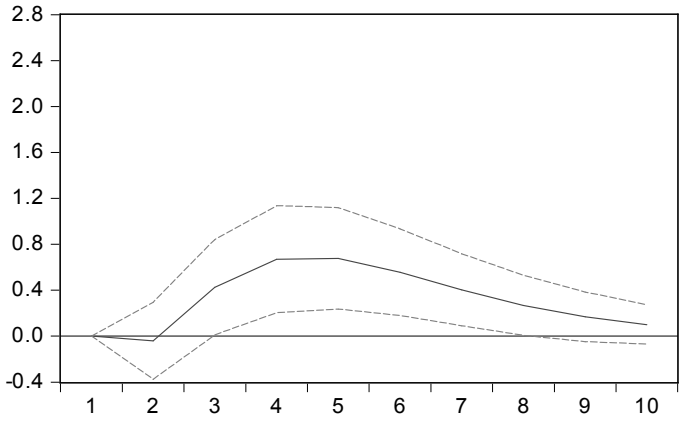

Figure 8. Impulse-Response Analysis: Response of BDEF to INTRATE

Figure 9 shows that a one-standard deviation increase in the BDEF creates a small response in INTRATE. After a small brief change, the response in the INTRATE falls to zero quickly (implying that INTRATE will return to its initial level). The results of variance decompositions are represented in Table 10, which shows three key characteristics as follows:

- Most of the variance of BDEF and INTRATE series is explained by their own shocks;
- The proportion of the movement in BDEF series, which is due to shocks in INTRATE series, is generally higher than that in INTRATE series, which is due to shocks in BDEF series;
- At the year 10-time horizon, approximately 10.92% of the forecast error variance of BDEF series in the VAR can be explained by exogenous shocks to the INTRATE series. Conversely, this number is only approximately 4.63% in the case of INTRATE series.

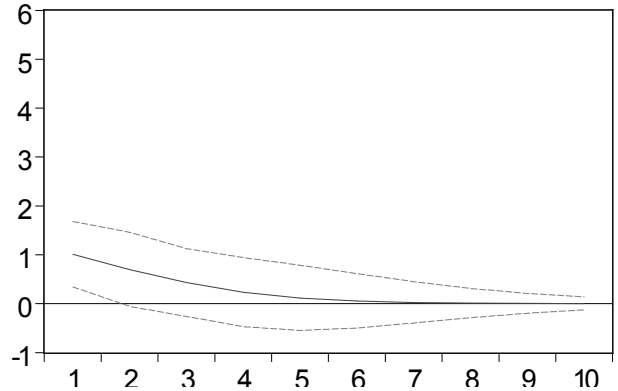

Figure 9. Impulse-Response Analysis: Response of INTRATE to BDEF

Table 10. Variance Decompositions

Variance Decomposition of BDEF:			
Period	S.E.	BDEF	INTRATE
1	2.378484	100.0000	0.000000
2	3.233737	99.98151	0.018495
3	3.572845	98.60817	1.391829
4	3.722628	95.54609	4.453905
5	3.801976	92.61318	7.386817
6	3.844946	90.71086	9.289145
7	3.866112	89.73407	10.26593
8	3.875362	89.30637	10.69363
9	3.878991	89.13961	10.86039
10	3.880297	89.07982	10.92018
Variance Decomposition of INTRATE:			
Period	S.E.	BDEF	INTRATE
1	4.866315	4.280202	95.71980
2	5.630991	4.726771	95.27323
3	5.934594	4.778104	95.22190
4	6.062131	4.727782	95.27222
5	6.116136	4.680489	95.31951
6	6.138519	4.653850	95.34615
7	6.147501	4.641634	95.35837
8	6.150988	4.636621	95.36338
9	6.152304	4.634692	95.36531
10	6.152791	4.633976	95.36602

Note: Cholesky Ordering: BDEF-INTRATE

From an economic point of view, Rose and Hakes (1995, p. 57) document that "an implication of Ricardian equivalence is that deficits are neutral. That is, deficits fail to affect real variables such as real interest rates". Our previous analyses provide evidence that is consistent with what the RET predicts. This means the U.S. federal budget deficits (BDEF) will have no impact on real interest rates (INTRATE).

4. Conclusion

This study investigates the relationship between the U.S. federal budget deficits and the real interest rates time series. We estimated appropriate ARMA models and VAR models for the BDEF and INTRATE, as well as discussed the implications of the results for the RET. It is found that the real interest rates will not be affected by the U.S. federal budget deficits. This conclusion is in agreement with what the RET predicts. However, it is noteworthy that although our empirical evidence does not support the significant influences of the deficits on the real interest rates, such an evidence "should not make us confident that larger future deficits will also fail to increase interest rates", as what Rose and Hakes (1995, p. 64) have warned.

5. Acknowledgements

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Mathematical and Quantitative Methods

A Mathematical Model of an Open Economy with Applications in Romania

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Abstract: In this paper, we first study the static equilibrium of a a closed economy model in terms of dependence on national income and interest rate from the main factors namely the marginal propensity to consume, tax rate, investment rate and the rate of currency demand. In the second part, we study the dynamic equilibrium solutions in terms of stability. We thus obtain the variation functions of national income and interest rate variation and their limit values. Finally, we propose two scenarios of economic development of Romania.

Keywords: equilibrium; demand; income

JEL Classification: R12

1. Introduction

In a previous paper, we proposed a model of economic equilibrium in an open economy. We will resume in the first part, the model equations to tie naturally, the case study of theoretical considerations.

The model presented below is a generalization of a closed economy model with government sector and money market (Stancu & Mihail, 2009) which the authors call M_3 - name that we still use when it references will be required.

Unlike the classical model, we consider net exports as the difference between exports and imports.

The essential differences compared to the M_3, which allow a more realistic analysis, are the following:

1. Government expenditures were proportional to the level of GDP (compared to the M_3 which are considered constant). In principle, we could consider a linear

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dependence of GDP, denoted by Y, but regression analysis could not justify the existence of a nonzero free term of the regression. It is clear from the mathematical calculus, that it arise naturally from the fact that, in the absence of potential GDP, government spending cannot exist.

2. The investments dependence is linear by GDP and interest rate without free term. Again, the difference to the M_3 is the renunciation of free term (because of the failure to check the null hypothesis), which, in economic terms, is that in the absence of output and monetary policy, investments are null.
3. Net exports were considered to be proportional to GDP, the absence of the constant term is due to inability to import or export in the absence of the output.
4. Government transfers were assumed to be proportional to GDP (compared to M_3 where are considered constant), again without free term because there cannot be an output without the necessary transfers.
5. The demand for money in the economy was regarded as linearly dependent on GDP and interest rate, with no free term. Again, the difference to the M_3 is the free term waiver, which in economic terms means that in the absence of output and monetary policy, money demand in the economy is null.

The first equation of the model is:

$$(1) D=C+G+I+NX$$

where:

- D – aggregate demand;
- C – actual final consumption of households;
- G – collective final consumption of general government;
- I – investments;
- NX – net exports

The second equation determines the relationship between consumption of households and disposable income:

$$(2) C=c_V V+C_0,\ C_0>0,\ c_Y \in (0,1)$$

where:

- c_V – marginal propensity to consumption, $c_V=\frac{dC}{dV} \in (0,1)$ and C_0 is autonomous consumption of households;

- V – disposable income

(3) $G=g_Y Y$, $g_Y \in (0,1)$

where:

- g_Y – marginal government consumption;
- Y – output

(4) $I=in_Y Y+i_r r$;

$in_Y \in (0,1)$, $i_r<0$

where:

- in_Y – investment rate, $in_Y \in (0,1)$;
- i_r – influence factor in the investments of the interest rate, $i_r<0$;
- r – interest rate

(5) $NX=\nu_Y Y$;

$\nu_Y \in (-1,1)$

where: ν_Y – marginal net exports

(6) $V=Y+TR-TI$;

$TR>0$

where:

- TR – government transfers;
- TI – taxes

(7) $TR=\theta_Y Y$;

$\theta_Y \in (0,1)$

where: θ_Y – marginal rate of government transfers

(8) $TI=ri_Y Y+T_0$, $ri_Y \in (0,1)$;

$T_0 \in \mathbf{R}$

where:

- ri_Y – tax rate, $ri_Y \in (0,1)$;
- T_0 – independent of income taxes (such as, for example, property taxes)

(9) D=Y – the first equation of static equilibrium;

(10) $MD=md_Y Y+m_r r,\ md_Y>0,\ m_r<0$

where:

- MD – money demand in the economy;
- md_Y – rate of money demand in the economy;
- m_r – influence factor of the demand for money in relation to interest rate, $m_r<0$;

(11) MD=M – the second static equilibrium equation

where: M – money supply.

(12) $\frac{dY}{dt}=\alpha(D-Y);$

$\alpha>0$ – the first dynamic equation;

(13) $\frac{dr}{dt}=\beta(MD-M)$

$\beta>0$ – the second dynamic equation

where:

- α - proportionality constant of the speed of variation of output relative to the gap between aggregate demand and GDP;
- β - proportionality constant of the speed of variation in interest rate in relation to the gap between demand and supply of money in the economy.

2. Static Equilibrium

Static equilibrium occurs when aggregate demand equals output (equation 9), and the supply and demand for money are also equal (equation 11).

From equations (1) – (8) follow:

(14) $D=C+G+I+NX=c_V V+C_0+g_Y Y+in_Y Y+i_r r+\nu_Y Y=c_V(Y+TR-TI)+C_0+g_Y Y+in_Y Y+i_r r+\nu_Y Y=$

$c_V(Y+\theta_Y Y-ri_Y Y-T_0)+C_0+g_Y Y+in_Y Y+i_r r+\nu_Y Y=$

$c_V Y+c_V\theta_Y Y-c_V ri_Y Y-c_V T_0+C_0+g_Y Y+in_Y Y+i_r r+\nu_Y Y=$

$Y(c_V+c_V\theta_Y-c_V ri_Y+g_Y+in_Y+\nu_Y)-c_V T_0+C_0+i_r r=$

$Y[c_V(1+\theta_Y-ri_Y)+g_Y+in_Y+\nu_Y]+C_0-c_V T_0+i_r r$

Noting:

(15) $E=C_0-c_V T_0$

(16) $\omega=1+\theta_Y-ri_Y$

(17) $\chi=1-c_V(1+\theta_Y-ri_Y)-g_Y-in_Y-\nu_Y=1-c_V\omega-g_Y-in_Y-\nu_Y$

results, first, from (2), (6), (7) and (8) and with (15) and (16):

$C=c_V V+C_0=c_V(Y+TR-TI)+C_0=c_V(Y+\theta_Y Y-ri_Y Y-T_0)+C_0=c_V[(1+\theta_Y-ri_Y)Y-T_0]+C_0=$

$c_V[\omega Y-T_0]+C_0=c_V\omega Y+C_0-c_V T_0=c_V\omega Y+E$ so:

(18) $C=c_V\omega Y+E$

How, in the absence of the output (Y=0) household consumption must be positive, it follows that $C=E\geq 0$.

Also, after the assumptions that $ri_Y\in(0,1)$, $\theta_Y\in(0,1)$ we obtain that: $\omega=1+\theta_Y-ri_Y\in(0,2)$ so it is still positive.

With the notations (15) - (17), equation (14) becomes:

(19) $D=Y(1-\chi)+i_r r+E$

The first static equilibrium equation D=Y is now> $Y(1-\chi)+i_r r+E=Y$ then:

$i_r r+E=Y-Y(1-\chi)=\chi Y$ from where:

(20) $Y=\frac{i_r}{\chi}r+\frac{E}{\chi}$

The natural condition of decreasing the output Y to an increasing of the interest rate (r) returns to $Y'(r)=\frac{i_r}{\chi}<0$ therefore, together with the hypothesis from (4) that is $i_r<0$, implies that $\chi>0$.

From the fact that $c_V, g_Y, in_Y, \theta_Y, ri_Y\in(0,1)$, $\nu_Y\in(-1,1)$ follows that $\chi>0$ or:

$\chi=1-c_V(1+\theta_Y-ri_Y)-g_Y-in_Y-\nu_Y>0$ if and only if:

$1-g_Y-in_Y-\nu_Y>c_V(1+\theta_Y-ri_Y)$ and how $1+\theta_Y-ri_Y\in(0,2)$ results, finally, that:

(21) $c_V<\frac{1-g_Y-in_Y-\nu_Y}{1+\theta_Y-ri_Y}$

Similarly, from equations (10) and (11): $MD=md_Y Y+m_r r=M$ is obtained: $md_Y Y=M-m_r r$ from where:

$$Y=-\frac{m_r}{md_Y}r+\frac{M}{md_Y} \quad (22)$$

The equilibrium condition in both markets (goods and services on the one hand and the money of the other) resulting from equations (20) and (22):

$$\begin{cases} Y=\frac{i_r}{\chi}r+\frac{E}{\chi} \\ Y=-\frac{m_r}{md_Y}r+\frac{M}{md_Y} \end{cases} \quad (23)$$

The solution of the system is:

$$\begin{cases} Y^*=\frac{Mi_r+Em_r}{i_r md_Y+m_r\chi} \\ r^*=\frac{M\chi-Emd_Y}{i_r md_Y+m_r\chi} \end{cases} \quad (24)$$

The equations (24) characterize the static equilibrium condition of the model.

From equations (2)-(8), (10), (24) result the values of main key indicators at the equilibrium:

$$G^*=g_Y Y^*=\frac{(Mi_r+Em_r)g_Y}{i_r md_Y+m_r\chi} \quad (25)$$

$$NX^*=\nu_Y Y^*=\frac{(Mi_r+Em_r)\nu_Y}{i_r md_Y+m_r\chi} \quad (26)$$

$$TR^*=\theta_Y Y^*=\frac{(Mi_r+Em_r)\theta_Y}{i_r md_Y+m_r\chi} \quad (27)$$

$$TI^*=ri_Y Y^*+T_0=\frac{(Mi_r+Em_r)ri_Y}{i_r md_Y+m_r\chi}+T_0 \quad (28)$$

$$I^*=in_Y Y^*+i_r r^*=\frac{(Mi_r+Em_r)in_Y}{i_r md_Y+m_r\chi}+\frac{(M\chi-Emd_Y)i_r}{i_r md_Y+m_r\chi}=\frac{(in_Y+\chi)i_r M+(m_r in_Y-md_Y i_r)E}{i_r md_Y+m_r\chi} \quad (29)$$

$$MD^*=md_Y Y^*+m_r r^*=\frac{(Mi_r+Em_r)md_Y}{i_r md_Y+m_r\chi}+\frac{(M\chi-Emd_Y)m_r}{i_r md_Y+m_r\chi}=M$$

$$V^* = Y^* + TR^* - TI^* = \frac{(Mi_r + Em_r)(1 + \theta_Y - ri_Y)}{i_r md_Y + m_r \chi} - T_0 \quad (30)$$

$$(32)\quad C^* = c_V V^* + C_0 = \frac{(Mi_r + Em_r)(1 + \theta_Y - ri_Y)c_V}{i_r md_Y + m_r \chi} - c_V T_0 + C_0 =$$

$$\frac{(Mi_r + Em_r)(1 + \theta_Y - ri_Y)c_V}{i_r md_Y + m_r \chi} + E = \frac{i_r(1 + \theta_Y - ri_Y)c_V M + [(1 + \theta_Y - ri_Y)m_r c_V + i_r md_Y + m_r \chi]E}{i_r md_Y + m_r \chi} =$$

$$\frac{i_r(1 + \theta_Y - ri_Y)c_V M + [i_r md_Y + m_r(1 - g_Y - in_Y - \nu_Y)]E}{i_r md_Y + m_r \chi}$$

Noting now, for simplicity:

$$(33)\quad \Lambda = \frac{1}{i_r md_Y + m_r \chi} < 0$$

$$(34)\quad \Gamma = (Mi_r + m_r E)\Lambda^2 < 0$$

follows, also:

$$M\chi - Emd_Y = \frac{\Gamma\chi - E\Lambda}{i_r \Lambda^2} = \frac{M\Lambda - md_Y \Gamma}{m_r \Lambda^2} \quad (35)$$

Substituting (33), (34) and (35) into formulas (24) follows:

$$(36)\quad \begin{cases} Y^* = \dfrac{\Gamma}{\Lambda} \\ r^* = \dfrac{\Gamma\chi - E\Lambda}{i_r \Lambda} = \dfrac{M\Lambda - md_Y \Gamma}{m_r \Lambda} \end{cases}$$

From the formulas (24) or (36) with notations (33)-(35) results, also, the partial derivatives of first and second orders of the equilibrium values of the output and interest rate respectively, required for the analysis of static equilibrium at a change of model parameters.

$$(37)\quad \frac{\partial Y^*}{\partial c_V} = m_r(\omega\Gamma - T_0\Lambda);$$

$$\frac{\partial Y^*}{\partial g_Y} = \frac{\partial Y^*}{\partial \nu_Y} = \frac{\partial Y^*}{\partial in_Y} = m_r \Gamma;$$

$$\frac{\partial Y^*}{\partial \theta_Y} = -\frac{\partial Y^*}{\partial ri_Y} = m_r c_V \Gamma \quad ;$$

$$\frac{\partial Y^*}{\partial i_r} = M\Lambda - md_Y \Gamma \quad ;$$

$$\frac{\partial Y^*}{\partial md_Y} = -i_r \Gamma \quad ;$$

$$\frac{\partial Y^*}{\partial m_r} = -i_r \frac{M\Lambda - md_Y \Gamma}{m_r} \quad ;$$

$$\frac{\partial Y^*}{\partial M} = i_r \Lambda$$

$$\frac{\partial r^*}{\partial c_V} = -md_Y \left(\omega\Gamma - T_0 \Lambda\right) \quad ; \tag{38}$$

$$\frac{\partial r^*}{\partial g_Y} = \frac{\partial r^*}{\partial \nu_Y} = \frac{\partial r^*}{\partial in_Y} = -md_Y \Gamma \quad ;$$

$$\frac{\partial r^*}{\partial \theta_Y} = -\frac{\partial r^*}{\partial ri_Y} = -md_Y c_V \Gamma \quad ;$$

$$\frac{\partial r^*}{\partial i_r} = -md_Y \frac{M\Lambda - md_Y \Gamma}{m_r} \quad ;$$

$$\frac{\partial r^*}{\partial md_Y} = -\chi\Gamma \quad ;$$

$$\frac{\partial r^*}{\partial m_r} = -\chi \frac{M\Lambda - md_Y \Gamma}{m_r} \quad ;$$

$$\frac{\partial r^*}{\partial M} = \chi\Lambda$$

$$\frac{\partial^2 Y^*}{\partial c_V^2} = 2\left(\omega\Gamma - T_0 \Lambda\right)\omega m_r^2 \Lambda \quad ; \tag{39}$$

$$\frac{\partial^2 Y^*}{\partial g_Y^2} = \frac{\partial^2 Y^*}{\partial \nu_Y^2} = \frac{\partial^2 Y^*}{\partial in_Y^2} = 2m_r^2 \Gamma \Lambda \quad ;$$

$$\frac{\partial^2 Y^*}{\partial \theta_Y^2} = -\frac{\partial^2 Y^*}{\partial ri_Y^2} = 2c_V m_r^2 \Gamma \Lambda \quad ;$$

$$\frac{\partial^2 Y^*}{\partial i_r^2} = -2\left(M\Lambda - md_Y \Gamma\right) md_Y \Lambda \quad ;$$

$$\frac{\partial^2 Y^*}{\partial md_Y^2} = 2i_r^2 \Gamma \Lambda \quad ;$$

$$\frac{\partial^2 Y^*}{\partial m_r^2} = 2\chi i_r \Lambda \frac{M\Lambda - md_Y \Gamma}{m_r} \quad ;$$

$$\frac{\partial^2 Y^*}{\partial M^2} = 0$$

$$\frac{\partial^2 r^*}{\partial c_V^2} = -2\left(\omega\Gamma - T_0 \Lambda\right) \omega md_Y m_r \Lambda \quad ; \tag{40}$$

$$\frac{\partial^2 r^*}{\partial g_Y^2} = \frac{\partial^2 r^*}{\partial \nu_Y^2} = \frac{\partial^2 r^*}{\partial in_Y^2} = -2m_r md_Y \Gamma \Lambda \quad ;$$

$$\frac{\partial^2 r^*}{\partial \theta_Y^2} = -\frac{\partial^2 r^*}{\partial ri_Y^2} = -2c_V m_r md_Y \Gamma \Lambda \quad ;$$

$$\frac{\partial^2 r^*}{\partial i_r^2} = 2\frac{md_Y^2}{m_r}\left(M\Lambda - md_Y \Gamma\right)\Lambda \quad ;$$

$$\frac{\partial^2 r^*}{\partial md_Y^2} = 2i_r \chi \Gamma \Lambda \quad ;$$

$$\frac{\partial^2 r^*}{\partial m_r^2} = 2\chi^2 \Lambda \frac{M\Lambda - md_Y \Gamma}{m_r} \quad ;$$

$$\frac{\partial^2 r^*}{\partial M^2} = 0$$

For the analysis of the increasing or decreasing character of Y^* or r^* with respect to each parameter of the model (assuming that everyone else is constant), we can see that from the formulas (37)-(39) the only directly independent expressions from the model parameters are $\omega\Gamma - T_0\Lambda$ and $M\Lambda - md_Y\Gamma$. Therefore, it is necessary, first of all, to study their sign.

The condition that $\omega\Gamma - T_0\Lambda > 0$ is equivalent to (from the formulas 33 and 34) with:

$$0 < \omega\Gamma - T_0\Lambda = \omega(Mi_r + m_r E)\Lambda^2 - T_0\Lambda = \Lambda^2\left(\omega(Mi_r + m_r E) - \frac{T_0}{\Lambda}\right) =$$

$$\Lambda^2\left[\omega(Mi_r + m_r E) - T_0(i_r md_Y + m_r\chi)\right] =$$

$$\Lambda^2\left[\omega Mi_r + \omega m_r(C_0 - c_V T_0) - T_0(i_r md_Y + m_r\chi)\right] =$$

$$\Lambda^2\left[\omega Mi_r + \omega m_r C_0 - T_0(i_r md_Y + m_r\chi + c_V\omega m_r)\right] =$$

$$\omega m_r\Lambda^2\left(C_0 - \frac{T_0(i_r md_Y + m_r\chi + c_V\omega m_r) - \omega Mi_r}{\omega m_r}\right)$$

Noting:

$$(41)\quad \Phi_1 = \frac{T_0(i_r md_Y + m_r\chi + c_V\omega m_r) - \omega Mi_r}{\omega m_r}$$

follows that $\omega\Gamma - T_0\Lambda > 0$ if and only if: $C_0 < \Phi_1$.

We see now that $C_0 = \Phi_1$ if and only if: $C_0 = \frac{T_0(i_r md_Y + m_r\chi + c_V\omega m_r) - \omega Mi_r}{\omega m_r}$ or, equivalently: $T_0 = \frac{\omega m_r C_0 + \omega Mi_r}{i_r md_Y + m_r\chi + c_V\omega m_r}$.

Therefore:

- $\omega\Gamma - T_0\Lambda > 0 \Leftrightarrow C_0 < \Phi_1 \Leftrightarrow C_0 < \frac{T_0(i_r md_Y + m_r\chi + c_V\omega m_r) - \omega Mi_r}{\omega m_r} \Leftrightarrow$

$$T_0 > \frac{\omega m_r C_0 + \omega M i_r}{i_r m d_Y + m_r \chi + c_V \omega m_r}$$

- $\omega\Gamma - T_0\Lambda < 0 \Leftrightarrow C_0 > \Phi_1 \Leftrightarrow C_0 > \frac{T_0(i_r m d_Y + m_r \chi + c_V \omega m_r) - \omega M i_r}{\omega m_r} \Leftrightarrow$

$$T_0 < \frac{\omega m_r C_0 + \omega M i_r}{i_r m d_Y + m_r \chi + c_V \omega m_r}$$

- $\omega\Gamma - T_0\Lambda = 0 \Leftrightarrow C_0 = \Phi_1 \Leftrightarrow C_0 = \frac{T_0(i_r m d_Y + m_r \chi + c_V \omega m_r) - \omega M i_r}{\omega m_r} \Leftrightarrow$

$$T_0 = \frac{\omega m_r C_0 + \omega M i_r}{i_r m d_Y + m_r \chi + c_V \omega m_r}$$

Similarly, the condition that $M\Lambda - md_Y\Gamma > 0$ is equivalent, successively, with:

$$0 < M\Lambda - md_Y\Gamma = M\Lambda - md_Y(Mi_r + m_r E)\Lambda^2 = \Lambda^2\left[\frac{M}{\Lambda} - md_Y(Mi_r + m_r E)\right] =$$

$$\Lambda^2\left[M(i_r m d_Y + m_r \chi) - md_Y(Mi_r + m_r E)\right] =$$

$$\Lambda^2\left[M(i_r m d_Y + m_r \chi) - md_Y(Mi_r + m_r(C_0 - c_V T_0))\right] =$$

$$\Lambda^2\left[m_r M\chi - md_Y m_r(C_0 - c_V T_0)\right] = m_r\Lambda^2(M\chi - md_Y C_0 + c_V md_Y T_0) =$$

$$m_r md_Y \Lambda^2\left(-C_0 + \frac{c_V md_Y T_0 + M\chi}{md_Y}\right).$$

Noting:

$$(42)\quad \Phi_2 = \frac{c_V md_Y T_0 + M\chi}{md_Y}$$

follows that $M\Lambda - md_Y\Gamma > 0$ if and only if: $C_0 > \Phi_2$.

We note now that $C_0 = \Phi_2$ if and only if: $C_0 = \frac{c_V md_Y T_0 + M\chi}{md_Y}$ or, equivalently, $T_0 = \frac{md_Y C_0 - M\chi}{c_V md_Y}$.

Also:

- $M\Lambda - md_Y\Gamma > 0 \Leftrightarrow C_0 > \Phi_2 \Leftrightarrow C_0 > \frac{c_V md_Y T_0 + M\chi}{md_Y} \Leftrightarrow T_0 < \frac{md_Y C_0 - M\chi}{c_V md_Y}$
- $M\Lambda - md_Y\Gamma < 0 \Leftrightarrow C_0 < \Phi_2 \Leftrightarrow C_0 < \frac{c_V md_Y T_0 + M\chi}{md_Y} \Leftrightarrow T_0 > \frac{md_Y C_0 - M\chi}{c_V md_Y}$
- $M\Lambda - md_Y\Gamma = 0 \Leftrightarrow C_0 = \Phi_2 \Leftrightarrow C_0 = \frac{c_V md_Y T_0 + M\chi}{md_Y} \Leftrightarrow T_0 = \frac{md_Y C_0 - M\chi}{c_V md_Y}$

We have also the relations:

$$\Phi_1-\Phi_2 = \frac{T_0\left(i_r md_Y + m_r\chi + c_V\omega m_r\right) - \omega M i_r}{\omega m_r} - \frac{M\chi + c_V md_Y T_0}{md_Y} =$$

$$\frac{T_0\left(i_r md_Y^2 + m_r md_Y\chi + c_V\omega m_r md_Y\right) - \omega M md_Y i_r - M\omega m_r\chi - c_V\omega m_r md_Y T_0}{\omega m_r md_Y} =$$

$$\frac{T_0\left(i_r md_Y^2 + m_r md_Y\chi\right) - M\omega\left(md_Y i_r + m_r\chi\right)}{\omega m_r md_Y} =$$

$$\frac{T_0 md_Y\left(i_r md_Y + m_r\chi\right) - M\omega\left(md_Y i_r + m_r\chi\right)}{\omega m_r md_Y} =$$

$$\frac{\left(md_Y i_r + m_r\chi\right)\left(T_0 md_Y - M\omega\right)}{\omega m_r md_Y} = \frac{T_0 md_Y - M\omega}{\omega m_r md_Y\Lambda}.$$

Note now that $\Phi_1=\Phi_2$ if and only if $T_0 = \frac{M\omega}{md_Y}$. In this situation, the conditions relative to the position of C_0 relative to $\Phi_1=\Phi_2$ becomes:

- $C_0 < \Phi_1=\Phi_2 \Leftrightarrow T_0 = \frac{M\omega}{md_Y}$ and $C_0 < \frac{\left(c_V\omega+\chi\right)M}{md_Y}$
- $C_0 > \Phi_1=\Phi_2 \Leftrightarrow T_0 = \frac{M\omega}{md_Y}$ and $C_0 > \frac{\left(c_V\omega+\chi\right)M}{md_Y}$

- $C_0=\Phi_1=\Phi_2 \Leftrightarrow T_0=\frac{M\omega}{md_Y}$ and $C_0=\frac{(c_V\omega+\chi)M}{md_Y}$

Because $\Lambda<0$, $m_r<0$, $md_Y>0$, $\omega>0$ it follows that $\Phi_1-\Phi_2>0$ if and only if $T_0md_Y-M\omega>0$ then:

- $\Phi_1>\Phi_2 \Leftrightarrow T_0>\frac{\omega M}{md_Y}$
- $\Phi_2>\Phi_1 \Leftrightarrow T_0<\frac{\omega M}{md_Y}$
- $\Phi_2=\Phi_1 \Leftrightarrow T_0=\frac{\omega M}{md_Y}$

Before considering the various cases generated from the level of taxes independent of income (T_0) and the autonomous consumption of households (C_0) respectively, remark that from formulas (37)-(39) that:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal government consumption g_Y, that is an increase in the share of government consumption in GDP will generate a stronger growth both GDP and interest rate. As a result of this situation, an increase in the budget drives to the increase in GDP but will affect also the growth of the interest rate, the last, with consequences in investments. Naturally the question arises whether the new level of investments will lead to a decrease or an increase in GDP. The differential of investments in relation to g_Y is:

$dI^*=in_YdY^*+i_rdr^*=in_Y\frac{\partial Y^*}{\partial g_Y}dg_Y+i_r\frac{\partial r^*}{\partial g_Y}dg_Y=in_Y m_r\Gamma dg_Y-i_r md_Y\Gamma dg_Y=(in_Y m_r-i_r md_Y)\Gamma dg_Y$

The condition that $(in_Y m_r-i_r md_Y)\Gamma>0$, due to the fact that $\Gamma<0$, is equivalent with $in_Y m_r-i_r md_Y<0$ or: $in_Y>\frac{i_r md_Y}{m_r}$. Therefore, an investment rate higher than the threshold $\frac{i_r md_Y}{m_r}$ will result that the investment will increase, and for a

$\frac{i_r md_Y}{m_r}$ lower investment rate than the increase in the share of government consumption in GDP will lead to a decrease in investment. How, in formulas (1) and (9): $Y^*=C^*+G^*+I^*+NX^*$ will result, finally, an increasing respectively decreasing GDP.

- Y^* and r^* are strictly increasing and strictly convex with respect to ν_Y, that is an increase in the share of net exports to GDP will generate a stronger increase both of GDP and interest rate. The differential of investments in relation to ν_Y is:

$dI^*=in_Y dY^*+i_r dr^*=in_Y \frac{\partial Y^*}{\partial \nu_Y} d\nu_Y+i_r \frac{\partial r^*}{\partial \nu_Y} d\nu_Y=in_Y m_r \Gamma d\nu_Y-i_r md_Y \Gamma d\nu_Y=$ $(in_Y m_r - i_r md_Y)\Gamma d\nu_Y$. The condition that $(in_Y m_r - i_r md_Y)\Gamma >0$, due to the fact that $\Gamma<0$, is equivalent with $in_Y m_r - i_r md_Y < 0$ or other: $in_Y > \frac{i_r md_Y}{m_r}$. Therefore, for an investment rate higher than the threshold $\frac{i_r md_Y}{m_r}$ will result that the investment will increase, and for a lower investment rate than $\frac{i_r md_Y}{m_r}$ the increase in the share of the marginal net exports in GDP will lead to a decrease in investment. Similarly to the above, would result in the end, an increase or, respectively, decrease in the GDP.

- Y^* and r^* are strictly increasing and strictly convex with respect to in_Y – the investment rate, that is an increase in the share of investment in GDP will generate a stronger increase both of GDP and interest rate. This later aspect is normal, because the acceleration of investments require additional funding sources leading to greater interest rate.
- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal rate of government transfers θ_Y, that is an increase in the share of transfers in GDP will generate a stronger increase both of GDP and the interest rate. The differential of the investments in relation to θ_Y is:

$dI^*=in_Y dY^*+i_r dr^*=in_Y \frac{\partial Y^*}{\partial \theta_Y} d\theta_Y+i_r \frac{\partial r^*}{\partial \theta_Y} d\theta_Y=$ $in_Y m_r c_V \Gamma d\theta_Y-i_r md_Y c_V \Gamma d\theta_Y=$ $(in_Y m_r - i_r md_Y)c_V \Gamma d\theta_Y$. The condition that $(in_Y m_r - i_r md_Y)\Gamma >0$, due to the fact

that $\Gamma<0$, $c_V>0$, is equivalent with $in_Y m_r - i_r md_Y < 0$ or other: $in_Y > \frac{i_r md_Y}{m_r}$. Therefore, for an investment rate higher than the threshold $\frac{i_r md_Y}{m_r}$ will result that the investment will increase, and for a lower investment rate than $\frac{i_r md_Y}{m_r}$ the increase in the marginal rate of transfers in GDP will lead to a decrease in investment. Similarly to the above, would result in the end, an increase or, respectively, decrease in the GDP.

- Y^* and r^* are strictly decreasing and strictly concave with respect to ri_Y – tax rate, that is , an increase in the share of taxes in GDP will lead to a decrease becoming greater of GDP and interest rate. From formula (8) we have: $dTI^*=ri_Y dY^*=ri_Y \frac{\partial Y^*}{\partial ri_Y} dri_Y=-ri_Y m_r c_V \Gamma dri_Y<0$ therefore an increase in the tax rate will lead to a loss of tax revenue. Also, from the equations (2) and (6), we have $C^*=c_V V^*+C_0$ and $V^*=Y^*+TR^*-TI^*$ from where: $C^*=c_V(Y^*+TR^*-TI^*)+C_0=c_V Y^*+c_V TR^*-c_V TI^*+C_0$. Differentiating, assuming that transfers TR^* are constant, we obtain that $dC^*=c_V dY^*-c_V dTI^*=c_V \frac{\partial Y^*}{\partial ri_Y} dri_Y-c_V ri_Y \frac{\partial Y^*}{\partial ri_Y} dri_Y= -m_r(1-ri_Y)c_V^2 \Gamma dri_Y<0$ so the actual final consumption of households will decrease.
- Y^* is strictly decreasing and strictly convex with respect to the rate of money demand in the economy md_Y, that is an increase in demand for currency relative to GDP level will generate a decrease becoming more subdued of GDP. Also, r^* is strictly decreasing and strictly concave with respect to money demand rate md_Y, that is an increase in demand for currency relative to GDP level will generate a decrease becoming more pronounced of the interest rate. The differential of investments with respect to md_Y is:

$dI^*=in_Y dY^*+i_r dr^*=in_Y \frac{\partial Y^*}{\partial md_Y} dmd_Y+i_r \frac{\partial r^*}{\partial md_Y} dmd_Y=-in_Y i_r \Gamma dmd_Y-i_r \chi \Gamma dmd_Y= -(\chi+in_Y) i_r \Gamma dmd_Y<0$. Therefore, increases in the demand for money relative to GDP will (assuming constancy of other parameters) to a decrease in investment, GDP implicitly. Following this analysis, the dynamics of money demand will be lower to the GDP's growth.

- Y^* is is strictly increasing and linear, and r^* is strictly decreasing and linear with respect to the money supply M, i.e. an increase in the money supply will rise by virtue $dY^*= \frac{\partial Y^*}{\partial M} dM = i_r \Lambda dM > 0$, the growth of GDP, and since $dr^*= \frac{\partial r^*}{\partial M} dM = \chi \Lambda dM < 0$ a decrease of the interest rate.

For the remaining dependencies, we have now 13 cases with an appearance, at first sight, formal, but positioning in the following analysis, on concrete data, trends in both GDP and interest rate.

Case 1: $T_0 < \frac{\omega M}{md_Y}$, $C_0<\Phi_1<\Phi_2$. In this situation: $\omega\Gamma - T_0\Lambda > 0$ and $M\Lambda - md_Y\Gamma < 0$ from where:

- Y^* and r^* are strictly decreasing and strictly concave in relation to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly decreasing and strictly concave in relation to the factor of influence in the investment rate (i_r)
- Y^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)

Case 2: $T_0 < \frac{\omega M}{md_Y}$, $C_0=\Phi_1<\Phi_2$. In this case: $C_0= \frac{T_0(i_r md_Y + m_r\chi + c_V\omega m_r) - \omega M i_r}{\omega m_r}$ or, equivalent: $T_0 = \frac{\omega m_r C_0 + \omega M i_r}{i_r md_Y + m_r\chi + c_V\omega m_r}$, and $\omega\Gamma - T_0\Lambda = 0$ and $M\Lambda - md_Y\Gamma < 0$ from where:

- Y^* and r^* are constants with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly decreasing and strictly concave in relation to the factor of influence in the investment rate (i_r)
- Y^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)

- r^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)

Case 3: $T_0 < \frac{\omega M}{md_Y}$, $\Phi_1<C_0<\Phi_2$. In this case: $\omega\Gamma - T_0\Lambda < 0$ and $M\Lambda - md_Y\Gamma < 0$ from where:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly decreasing and strictly concave in relation to the factor of influence in the investment rate (i_r)
- Y^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly decreasing and strictly concave in relation to the factors that influence the demand for money in relation to interest rate (m_r)

Case 4: $T_0 < \frac{\omega M}{md_Y}$, $\Phi_1<\Phi_2=C_0$. In this case: $C_0 = \frac{c_V md_Y T_0 + M\chi}{md_Y}$, $T_0 = \frac{md_Y C_0 - M\chi}{c_V md_Y}$, $\omega\Gamma - T_0\Lambda < 0$ and $M\Lambda - md_Y\Gamma = 0$ from where:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are constants with respect to factors that influence interest rates in investments (i_r)
- Y^* is constant in relation to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is constant in relation to the factor that influence the demand for money in relation to interest rate (m_r)

Case 5: $T_0 < \frac{\omega M}{md_Y}$, $\Phi_1<\Phi_2<C_0$. In this case: $\omega\Gamma - T_0\Lambda < 0$ and $M\Lambda - md_Y\Gamma > 0$ from where:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly increasing and strictly convex with respect to the factor of influence in the investment rate (i_r)

- Y^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)

Case 6: $T_0 = \frac{\omega M}{md_Y}$, $C_0<\Phi_1=\Phi_2$. In this case: $C_0<\frac{(c_V\omega+\chi)M}{md_Y}$, $\omega\Gamma - T_0\Lambda>0$ and $M\Lambda - md_Y\Gamma<0$ from where:

- Y^* and r^* are strictly decreasing and strictly concave with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly decreasing and strictly concave in relation to the factor of influence in the investment rate (i_r)
- Y^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)

Case 7: $T_0 = \frac{\omega M}{md_Y}$, $C_0=\Phi_1=\Phi_2$. In this case: $C_0=\frac{(c_V\omega+\chi)M}{md_Y}$, $\omega\Gamma - T_0\Lambda=0$ and $M\Lambda - md_Y\Gamma=0$ from where:

- Y^* and r^* are constants with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are constants with respect to factors that influence interest rates in investments (i_r)
- Y^* and r^* are constants with respect to factors that influence the demand for money in relation to interest rate (m_r)

Case 8: $T_0 = \frac{\omega M}{md_Y}$, $\Phi_1=\Phi_2<C_0$. In this case: $C_0>\frac{(c_V\omega+\chi)M}{md_Y}$, $\omega\Gamma - T_0\Lambda<0$ and $M\Lambda - md_Y\Gamma<0$ from where:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly decreasing and strictly concave in relation to the factor of influence in the investment rate (i_r)

- Y^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)

Case 9: $T_0 > \frac{\omega M}{md_Y}$, $C_0<\Phi_2<\Phi_1$. In this case: $\omega\Gamma - T_0\Lambda > 0$ and $M\Lambda - md_Y\Gamma < 0$ from where:

- Y^* and r^* are strictly decreasing and strictly concave with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly decreasing and strictly concave in relation to the factor of influence in the investment rate (i_r)
- Y^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)

Case 10: $T_0 > \frac{\omega M}{md_Y}$, $C_0=\Phi_2<\Phi_1$. In this case: $C_0 = \frac{c_V md_Y T_0 + M\chi}{md_Y}$ or, equivalent: $T_0 = \frac{md_Y C_0 - M\chi}{c_V md_Y}$, $\omega\Gamma - T_0\Lambda > 0$ and $M\Lambda - md_Y\Gamma = 0$ from where:

- Y^* and r^* are strictly decreasing and strictly concave with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are constants with respect to the factor that influence interest rates of investments (i_r)
- Y^* and r^* are constants with respect to factors that influence the demand for money in relation to interest rate (m_r)

Case 11: $T_0 > \frac{\omega M}{md_Y}$, $\Phi_2<C_0<\Phi_1$. In this case: $\omega\Gamma - T_0\Lambda > 0$ and $M\Lambda - md_Y\Gamma > 0$ from where:

- Y^* and r^* are strictly decreasing and strictly concave with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly increasing and strictly convex with respect to the factor of influence in the investment rate (i_r)

- Y^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)

- **Case 12**: $T_0 > \frac{\omega M}{md_Y}$, $\Phi_2<\Phi_1=C_0$. In this case: $C_0= \frac{T_0(i_r md_Y + m_r\chi + c_V\omega m_r) - \omega M i_r}{\omega m_r}$ or, equivalent: $T_0 = \frac{\omega m_r C_0 + \omega M i_r}{i_r md_Y + m_r\chi + c_V\omega m_r}$, $\omega\Gamma - T_0\Lambda = 0$ and $M\Lambda - md_Y\Gamma > 0$ from where:

- Y^* and r^* are constants with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly increasing and strictly convex with respect to the factor of influence in the investment rate (i_r)
- Y^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r)

Case 13: $T_0 > \frac{\omega M}{md_Y}$, $\Phi_2<\Phi_1<C_0$. In this case: $\omega\Gamma - T_0\Lambda < 0$ and $M\Lambda - md_Y\Gamma > 0$ from where:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal propensity to consumption (c_V)
- Y^* and r^* are strictly increasing and strictly convex with respect to the factor of influence in the investment rate (i_r)
- Y^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r)
- r^* is strictly increasing and strictly convex with respect to factors that influence the demand for money in relation to interest rate (m_r)

3. The Determination of the Potential GDP. Okun's Law

The classical definition of potential GDP is one more or less formal in the sense that it is that level of GDP in the conditions of an optimal operation without imbalances in the economy. Following the model presented above, we define the equilibrium state as potential GDP.

Therefore, we define the potential GDP (Y^*) by the formula:

$$Y^* = \frac{Mi_r + Em_r}{i_r md_Y + m_r \chi} \quad (43)$$

Once determined the level of potential GDP, we naturally put the problem of calculating the natural rate of unemployment. The well-known expression of Okun's law is:

$$\frac{Y^* - Y}{Y^*} = c\left(u - u^*\right) \quad (44)$$

where:

- Y – current GDP;
- Y^* – potential GDP;
- u – the unemployment rate;
- u^* – the natural rate of unemployment;
- c – factor of proportionality

Due to the difficulties of Okun's law (in the sense that the determination of the constant c requires both knowledge of potential GDP - defined by formula (43) and the natural rate of unemployment - which is exactly the approach the front) is used in practice, a modified form of it (with the assumption that the economy is turning to potential GDP and the natural rate of unemployment knows no significant variations in short intervals):

$$\frac{\Delta Y}{Y} = a - c\Delta u \quad (45)$$

The determination of the constants a and c is made with relative ease, using linear regression, given that the statistics are known as the level of GDP (Y) and obvious the variations (ΔY) and the unemployment rate.

Substituting the value of c as determined by the formulas (43) and (44) we obtain the natural rate of unemployment:

$$u^* = u - \frac{Y^* - Y}{cY^*} = u - \frac{1}{c} + \frac{i_r m d_Y + m_r \chi}{c(Mi_r + Em_r)} Y \quad (46)$$

From equation (46) it is observed that the natural rate of unemployment increases in relation to the factor $\frac{i_r m d_Y + m_r \chi}{c(Mi_r + Em_r)} > 0$.

4. The Dynamic Equilibrium

Equations (12) and (13) are dynamic equilibrium laws. It is observed that for the values of Y and r in the static equilibrium, follows: $\frac{dY}{dt} = \frac{dr}{dt} = 0$ so the dynamic process becomes stationary.

Consider then the system of differential equations of first order from the formulas (12) and (13):

$$\begin{cases} \frac{dY}{dt} = \alpha(D - Y) \\ \frac{dr}{dt} = \beta(MD - M) \end{cases}, \ \alpha, \beta > 0 \quad (47)$$

From (10) and (19) we can rewrite (47) as:

$$\begin{cases} \frac{dY}{dt} = -\alpha\chi Y + \alpha i_r r + \alpha E \\ \frac{dr}{dt} = \beta m d_Y Y + \beta m_r r - \beta M \end{cases} \quad (48)$$

From (48) follows: $\lim_{t\to\infty} Y(t) = \tilde{Y}$, $\lim_{t\to\infty} r(t) = \tilde{r}$, $\tilde{Y}, \tilde{r} \in \mathbf{R}_+$ if and only if:

1. $\Delta = (\alpha\chi + \beta m_r)^2 + 4\alpha\beta i_r m d_Y = 0$:

$$(49)\quad \begin{cases} Y = \left(-\dfrac{\alpha\chi+\beta m_r}{2}Y_0 + \alpha i_r r_0 + \alpha\dfrac{2i_r\beta M + E(\alpha\chi+\beta m_r)}{\alpha\chi-\beta m_r}\right)te^{\frac{-\alpha\chi+\beta m_r}{2}t} + \\ \left(Y_0 + 4\alpha\beta\dfrac{m_r E + i_r M}{(\alpha\chi-\beta m_r)^2}\right)e^{\frac{-\alpha\chi+\beta m_r}{2}t} + \dfrac{i_r M + m_r E}{\chi m_r + i_r m d_Y} \\ r = \left(r_0 - 4\alpha\beta\dfrac{-\chi M + m d_Y E}{(\alpha\chi-\beta m_r)^2}\right)e^{\frac{-\alpha\chi+\beta m_r}{2}t} + \\ \left(-\dfrac{\alpha\chi+\beta m_r}{2}Y_0 + \alpha i_r r_0 + \alpha\dfrac{2i_r\beta M + E(\alpha\chi+\beta m_r)}{\alpha\chi-\beta m_r}\right)\dfrac{\alpha\chi+\beta m_r}{2\alpha i_r}te^{\frac{-\alpha\chi+\beta m_r}{2}t} + \dfrac{\chi M - m d_Y E}{\chi m_r + i_r m d_Y} \end{cases}$$

and:

$$\begin{cases} \tilde{Y} = \dfrac{m_r E + i_r M}{\chi m_r + i_r m d_Y} \\ \tilde{r} = \dfrac{\chi M - m d_Y E}{\chi m_r + i_r m d_Y} \end{cases}$$

2. $\Delta=(\alpha\chi+\beta m_r)^2+4\alpha\beta i_r m d_Y>0$ and $\lambda_1\neq\lambda_2$ are real roots of the equation: $\lambda^2+(\alpha\chi-\beta m_r)\lambda-\alpha\beta(\chi m_r+i_r m d_Y)=0$:

$$(50)\quad \begin{cases} Y = k_1 e^{\lambda_1 t} + k_2 e^{\lambda_2 t} + \dfrac{m_r E + i_r M}{\chi m_r + i_r m d_Y} \\ r = \dfrac{\lambda_1+\alpha\chi}{\alpha i_r}k_1 e^{\lambda_1 t} + \dfrac{\lambda_2+\alpha\chi}{\alpha i_r}k_2 e^{\lambda_2 t} - \dfrac{m d_Y E - \chi M}{\chi m_r + i_r m d_Y} \end{cases}$$

where:

$$k_1 = \frac{(\lambda_2+\alpha\chi)Y_0 - (\lambda_2+\alpha\chi)\dfrac{m_r E + i_r M}{\chi m_r + i_r m d_Y} - \alpha i_r r_0 - \alpha i_r \dfrac{m d_Y E - \chi M}{\chi m_r + i_r m d_Y}}{\lambda_2 - \lambda_1}$$

$$k_2 = \frac{\alpha i_r r_0 + \alpha i_r \dfrac{m d_Y E - \chi M}{\chi m_r + i_r m d_Y} - (\lambda_1+\alpha\chi)Y_0 + (\lambda_1+\alpha\chi)\dfrac{m_r E + i_r M}{\chi m_r + i_r m d_Y}}{\lambda_2 - \lambda_1}$$

and:

$$\begin{cases} \tilde{Y} = \dfrac{m_r E + i_r M}{\chi m_r + i_r m d_Y} \\ \tilde{r} = \dfrac{\chi M - m d_Y E}{\chi m_r + i_r m d_Y} \end{cases}$$

3. $\Delta=(\alpha\chi+\beta m_r)^2+4\alpha\beta i_r m d_Y<0$ and $\lambda_1=\mu+i\nu$, $\lambda_2=\mu-i\nu$, $\nu\neq0$ are imaginary roots of the equation: $\lambda^2+(\alpha\chi-\beta m_r)\lambda-\alpha\beta(\chi m_r+i_r m d_Y)=0$:

$$
\begin{cases}
Y = \left(Y_0 - \dfrac{m_r E + i_r M}{\chi m_r + i_r md_Y} \right) e^{\mu t} \cos \nu t + \\
\dfrac{1}{\nu} \left(\alpha i_r r_0 - \dfrac{\beta m_r + \alpha \chi}{2} Y_0 + \dfrac{(\beta m_r + \alpha \chi)(i_r M + m_r E) + 2\alpha i_r (-\chi M + md_Y E)}{2(\chi m_r + i_r md_Y)} \right) e^{\mu t} \sin \nu t + \\
\dfrac{i_r M + m_r E}{\chi m_r + i_r md_Y} \\
r = \left(r_0 + \dfrac{-\chi M + md_Y E}{\chi m_r + i_r md_Y} \right) e^{\mu t} \cos \nu t + \\
\dfrac{1}{\nu} \left(\beta md_Y Y_0 + \dfrac{\beta m_r + \alpha \chi}{2} r_0 + \dfrac{(\beta m_r + \alpha \chi)(-\chi M + md_Y E) - 2\beta md_Y (m_r E + i_r M)}{2(\chi m_r + i_r md_Y)} \right) e^{\mu t} \sin \nu t + \\
\dfrac{\chi M - md_Y E}{\chi m_r + i_r md_Y}
\end{cases}
\tag{51}
$$

and:

$$
\begin{cases}
\tilde{Y} = \dfrac{m_r E + i_r M}{\chi m_r + i_r md_Y} \\
\tilde{r} = \dfrac{\chi M - md_Y E}{\chi m_r + i_r md_Y}
\end{cases}
$$

It is observed in the three cases above that the limit $\tilde{Y}$ of the output is just Y^* and those of interest rate $\tilde{r}$ is r^*.

5. The Analysis of the Romanian Economy

In this section we will apply the theoretical model outlined above for the Romanian economy. The data taken into account shall relate to the period 2001-2012 for the simple reason that to the year 2000, the economy went through a string "forever" restructuring and remodeling.

In order to correlate the real data collected from Romanian official sources (Romanian Statistical Yearbook, Monthly Statistical Bulletins of NSI and NBR) or international (World Bank), we first determine the cumulative deflator and inflation factor relative to a reference period, such as 2000.

Considering the GDP's deflator corresponding to the year "n": $GDP_{deflator,n} = \dfrac{GDP\ nominal_n}{GDP\ real_n}$, we will compute the cumulative deflator relative to 2000, by the formula:

$$GDP_{cumulative\ deflator,n}=\frac{GDP_{cumulativedeflator,n-1}}{GDP_{deflator,n}}=\frac{1}{\prod_{k=1}^{n}GDP_{deflator,k}}$$

where $GDP_{deflator,2000}=1$.

The obtained date is shown in Table 1.

Table 1. The Determination of Cumulative Deflator of GDP

Year (n)	Deflator GDP ($GDP_{deflator,n}$)	Cumulative deflator ($GDP_{deflator\ cumulative,n}$)
2000	-	1
2001	1.374	0.727802038
2002	1.234	0.589790954
2003	1.24	0.475637867
2004	1.15	0.413598145
2005	1.123	0.368297547
2006	1.108	0.332398508
2007	1.13	0.294157971
2008	1.116	0.263582412
2009	1.065	0.247495222
2010	1.036	0.238895002
2011	1.071	0.223057892
2012	1.052	0.212032217

Source: World Bank

Considering, also, the consumer price index: CPI for the year "n": CPI_n, $\pi_n=CPI_{n-1}-1$ – inflation, we will compute the cumulative consumer price index $CPI_{cumulative}$, relative to the reference period 2000 by the formula:

$$CPI_{cumulative,n}=\frac{CPI_{cumulative,n-1}}{CPI_n}=\frac{1}{\prod_{k=1}^{n}CPI_k}$$

where $CPI_{2000}=1$ we obtain:

Table 2. The Determination of Cumulative Inflation

Year (n)	The Consumer Price Index ($CPI_n=1+\pi_n$)	Inflation factor (π_n)	The cumulative Consumer Price Index ($CPI_{cumulative,n}$)
2000	-	-	1
2001	1.345	0.345	0.743494424
2002	1.225	0.225	0.606934224
2003	1.153	0.153	0.526395684
2004	1.119	0.119	0.470416161
2005	1.09	0.09	0.431574459
2006	1.065	0.065	0.405234234
2007	1.0484	0.0484	0.386526358
2008	1.0785	0.0785	0.358392544
2009	1.0559	0.0559	0.33941902
2010	1.0609	0.0609	0.31993498
2011	1.0579	0.0579	0.302424596
2012	1.0333	0.0333	0.292678405

Source: INSSE

5.1The Determination of the Linear Regression $C=c_VV+C_0$

During 2001-2012, the final individual consumption of households (C) and the disposable income (V) had the following values:

Table 3. The Actual Final Consumption of Households and the Disposable Income in the Period 2001-2012

Year	Actual final consumption of households (mil. current) C	Actual final consumption of households (mil. lei-2000) C	National disposable income (mil. current) V	National disposable income (mil. lei-2000) V
2001	92177.3	67086.83	102486.7	74590.0
2002	116895.7	68944.03	132454.7	78120.6
2003	149395.8	71058.30	167428.1	79635.1

2004	191499.0	79203.63	204571.9	84610.6
2005	226928.7	83577.28	243518.1	89687.1
2006	268441.3	89229.49	269977.5	89740.1
2007	313223.3	92137.13	326148.3	95939.1
2008	381108.1	100453.40	430582.8	113494.1
2009	362749.9	89778.87	417915.8	103432.2
2010	382446.2	91364.49	439887.3	105086.9
2011	401336.8	89521.34	456694.8	101869.4
2012	418716.6	88781.41	478353.2	101426.3

Source: INSSE

The corresponding regression analysis of data in Table 3 (in million-2000) provides the following results:

- The empirical correlation coefficient is ρ=0.93971118. The critical value of the correlation coefficient rc for 12 values of exogenous variable is 0.576 for a significance level of more than 0.95, so how $|\rho|$>rc a linear dependence between variables may exist.
- The R Square=0.8831 means that 88.31% of the total variation of consumption variable is explained by the variation of the national disposable income, the remaining 11.69% being due to other factors.
- The Fisher-Snedecor statistics F allows the analysis of the null hypothesis H_0 which states that all regression coefficients are equal to 0. Computing $F_{\alpha,k,N-(k+1)}$ where α=0.05, k=1 (the number of degrees of freedom corresponding regression (explanatory factor), N-(k+1)=10 (the number of degrees of freedom corresponding to residual factor (unregistered factors), if $F \leq F_{\alpha,k,N-(k+1)}$ then the null hypothesis H_0 with probability 1-α will be rejected, that is at least one of the coefficients can be nonzero. If $F > F_{\alpha,\ k,\ N-(k+1)}$ then the null hypothesis H_0 states that all coefficients are null, the regression being not valid. In this case, F=75.511819 and $F_{0.05;\ 1;\ 10}$=0.004134. Therefore, the null hypothesis H_0 is rejected with probability 0.95.

- Significance F value represents the probability that the regression equation cannot explain the evolution of the endogenous variable (links coincidental phenomenon). If Significance F<α then the null hypothesis H_0 is rejected with probability 1-α, so it is possible that at least one coefficient be different from 0. In the present model we have Significance $F=5.66615\cdot10^{-6}<0.05$ so the null hypothesis H_0 is rejected with probability 0.95.
- Relative to the values P-value, if one value is less than α then the variable significantly influences the process. In this case: P-value(C_0)=0.288568 and P-value(c_V)=$5.666151\cdot10^{-6}$ so both autonomous consumption of households and national disposable income affects household final consumption.
- The intervals [Lower 71%, Upper 71%] are the confidence intervals in which belong the coefficients. If 0 belongs to the range then do not reject the null hypothesis relative to the coefficient, so the variable is further removed from the model. In the case of our regression, $C_0\in$[30.45076;19357.90806] and $c_V\in$[0.69769,0.90357] so, besides the rejected of null hypothesis, it can be stated that the values of C_0 and c_V with a higher probability of 0.71 belong in the respective intervals.

Therefore, after the regression analysis, we obtain that the average of the household final consumption dependence of national disposable income is:

(52) $C=0.80063\cdot V+9694.17941$

where:

(53) $c_V=0.80063$

(54) $C_0=9694.17941$

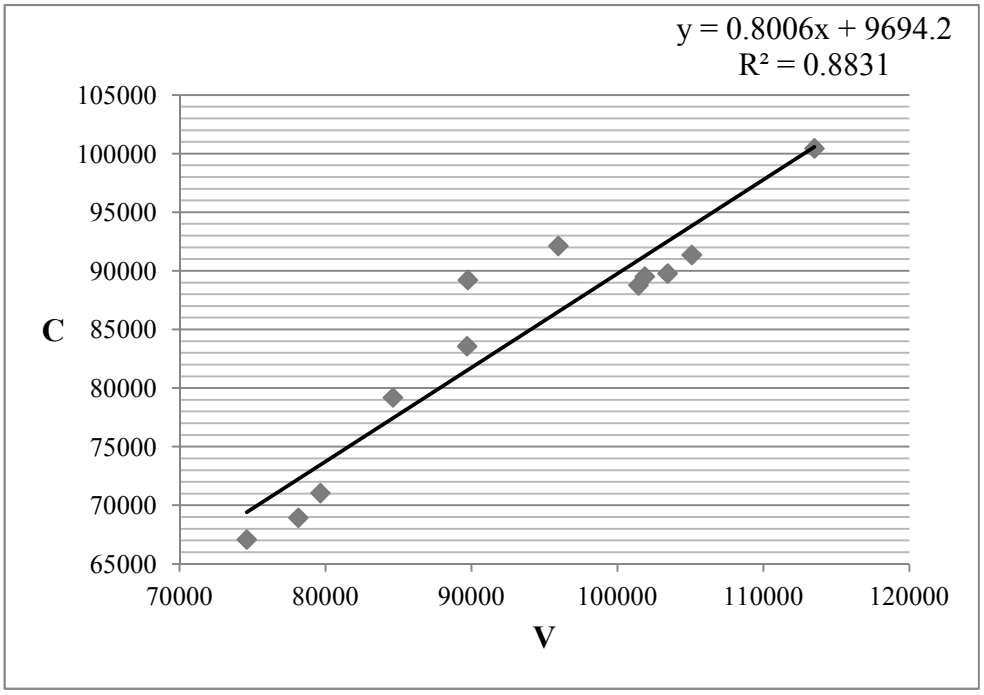

Figure 1. The dependence of household final consumption by the national disposable income during 2001-2012

From equation (52) we obtain that at an increase of 1000 million lei-2000 of the disposable income, the final consumption of households will increase, on average, with 800.63 million-2000 (in terms of autonomous consumption household constant).

5.2. The Determination of the Linear Regression $G=g_Y Y$

During the period 2001-2012, the collective final consumption of general government (G) records the following values:

Table 4. The Collective Final Consumption of General Government during 2001-2012

Year	The collective final consumption of general government (mil. current) G	The collective final consumption of general government (mil. lei-2000) G
2001	8554.4	6225.9098
2002	10223.1	6029.4919
2003	19422.9	9238.2667
2004	19555.6	8088.1599
2005	24109.4	8879.4329
2006	26426.3	8784.0627
2007	31713.7	9328.8377
2008	39809.4	10493.0577
2009	43873.4	10858.4569
2010	37355.0	8923.9228
2011	35148.2	7840.08340
2012	39869.2	8453.5549

Source: INSSE

Also in the same period, the Gross Domestic Product (denoted in the model with Y) has the following values:

Table 5. Gross Domestic Product during 2001-2012

Year	GDP (mil. current) Y	GDP (mil. lei-2000) Y
2001	117945.8	85841.1936
2002	152017.0	89658.2515
2003	197427.6	93904.0425
2004	247368.0	102310.9459
2005	288954.6	106421.2703
2006	344650.6	114561.3451
2007	416006.8	122371.7164
2008	514700.0	135665.8673
2009	501139.4	124029.6072
2010	523693.3	125107.7120
2011	556708.4	124178.2021
2012	587466.2	124561.7606

Source: INSSE

The corresponding regression analysis of data from tables 4 and 5 (in million-2000) provides the following results:

- The empirical correlation coefficient is $\rho=0.993465047>0.576$ for a significance level of more than 0.95, so that the linear dependence between variables may exist.
- The R Square=0.4836 means that 48.36% of the total variance of the variable collective final consumption of government is explained by the variation in GDP, the remaining 51.64% being due to other factors.
- The Fisher-Snedecor statistics F=833.3871101 and $F_{0.05;1;11}=0.004116$, so how $F> F_{0.05;1;11}$ then the null hypothesis H_0 will be rejected with probability 0.95, so the coefficient g_Y can be nonzero.
- Significance $F=5.79592\cdot10^{-11}<0.05$ therefore it is possible that the value g_Y be different from 0.
- P-value(g_Y)$=1.01269\cdot10^{-11}$ so the GDP affects the collective final consumption of government.
- Studying the interval [Lower95%,Upper95%] we have that $g_Y\in[0.070413161,0.082036189]$ with a probability greater than 0.95.

After the regression analysis, we obtain that, on average, the collective final consumption of government dependence from GDP is:

(55) $G=0.076224675\cdot Y$

where:

(56) $g_Y=0.076224675$

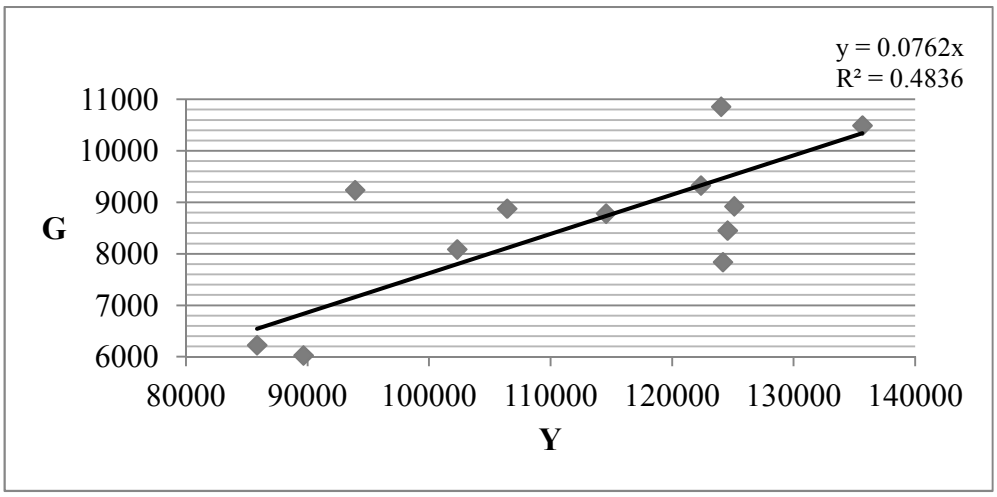

Figure 2. The dependence of the collective final consumption of government from GDP (mil. lei-2000)

From equation (55) we obtain that at an increase of 1000 million lei-2000 of GDP, the general government final consumption will increase by an average of 76.2 million-2000.

5.3 The Determination of the Linear Regression $I=in_YY+i_rr$

Given the existence of significant inflation, we first calculate the real interest rate (r_n) through the formula $r_n=\frac{rd_n-\pi_n}{1+\pi_n}$ where rd_n is the nominal interest rate.

Table 6. The Nominal and Real Interest Rates

Year (n)	The nominal interest rate (rd_n)	The real interest rate (r_n)
2001	0.3880	0.03197
2002	0.2847	0.04873
2003	0.1884	0.03070
2004	0.2027	0.07480
2005	0.0959	0.00541
2006	0.0844	0.01822
2007	0.0746	0.02499
2008	0.0946	0.01493
2009	0.0933	0.03542
2010	0.0667	0.00547
2011	0.0625	0.00435
2012	0.0531	0.01916

Source: INSSE

During 2001-2012, investments (I) have the following values:

Table 7. Investments during 2001-2012

Year	Investments (mil. current) I	Investments (mil. lei-2000) I
2001	26186.20	19058.37
2002	33446.10	19726.21
2003	43370.20	20628.51
2004	58551.40	24216.75
2005	67286.60	24781.49
2006	91188.30	30310.85
2007	128858.70	37904.81
2008	160896.90	42409.59
2009	127137.40	31465.90
2010	133898.60	31987.71
2011	149909.40	33438.47
2012	158727.80	33655.41

Source: INSSE

The corresponding regression analysis of data from tables 5, 6 and 7 (in million-2000) provides the following results:

- The empirical correlation coefficient is $\rho=0.994753707>0.576$ for a significance level of more than 0.95, so that the linear dependence between variables may exist.
- The Fisher-Snedecor statistics $F=472.7802825$ and $F_{0.05;2;10}=0.051557$, so how $F> F_{0.05;2;10}$ then the null hypothesis H_0 will be rejected with probability 0.95, so at least one coefficient can be nonzero.
- Significance $F=7.67318\cdot10^{-10}<0.05$ therefore it is possible that the values in_Y and i_r be different from 0.
- P-value(in_Y)$=1.05276\cdot10^{-9}$ and P-value(i_r)$=0.134714194$ means that the level of GDP and the real interest rate influences the level of investment with a degree of confidence over 86 %.
- Studying the interval [Lower86%, Upper86%] we have that $in_Y\in[0.257663378,0.299164024]$ and $i_r\in[-145195.7337,-1092.50004]$ with a probability greater than 0.86.

After the regression analysis, we obtain that, on average, the investment dependence from GDP and the real interest rate is:

(57) $I=0.278413701 \cdot Y-73144.11685 \cdot r$

where:

(58) $in_Y=0.278413701$

(59) $i_r=-73144.11685$

From equation (57) we obtain that an increase of 1000 million lei-2000 of GDP, given in the conditions of a constant real interest rate, investments will grow, on average, by 278.4 million lei- 2000. Also, in terms of GDP constant, an increase in the real interest rate by 0.01 will generate a decrease in investments of 731.4 million lei-2000.

5.4. The Determination of the Linear Regression $NX=\nu_Y Y$

During 2001-2012, Net Exports (NX) have record the following values:

Table 8. Net Exports of Romania during 2001-2012

Year	Net Exports (mil. current) NX	Net Exports (mil. lei-2000) NX
2001	-8972.10	-6529.9
2002	-8547.90	-5041.5
2003	-14761.30	-7021.0
2004	-22238.00	-9197.6
2005	-29370.10	-10816.9
2006	-41405.30	-13763.1
2007	-57788.90	-16999.1
2008	-67114.40	-17690.2
2009	-30273.50	-7492.5
2010	-30006.50	-7168.4
2011	-29686.00	-6621.7
2012	-29847.40	-6328.6

Source: INSSE

The corresponding regression analysis of data from tables 5 and 8 (in million-2000) provides the following results:

- The empirical correlation coefficient is $\rho=0.934871694>0.576$ for a significance level of more than 0.95, so that the linear dependence between variables may exist.

- The R Square=0.2034 means that only 20.34% of the total variance of the variable Net Exports is explained by the variation in GDP, the remaining 79.66% being due to other factors.
- The Fisher-Snedecor statistics F=76.29125409 and $F_{0.05;1;11}$=0.004116, so how F> $F_{0.05;1;11}$ then the null hypothesis H_0 will be rejected with probability 0.95, so the coefficient ν_Y can be nonzero.
- Significance F=$5.41218 \cdot 10^{-6}$<0.05 therefore it is possible that the value ν_Y be different from 0.
- P-value(ν_Y)=$2.80703 \cdot 10^{-6}$ so GDP affects Net Exports.
- Studying the interval [Lower95%, Upper95%] we have that $\nu_Y \in$[-0.107436875,-0.06418918] with a probability greater than 0.95.

After the regression analysis, we obtain that, on average, the Net Exports dependence from GDP is:

(60) NX=-0.085813028·Y

where:

(61) ν_Y=-0.085813028

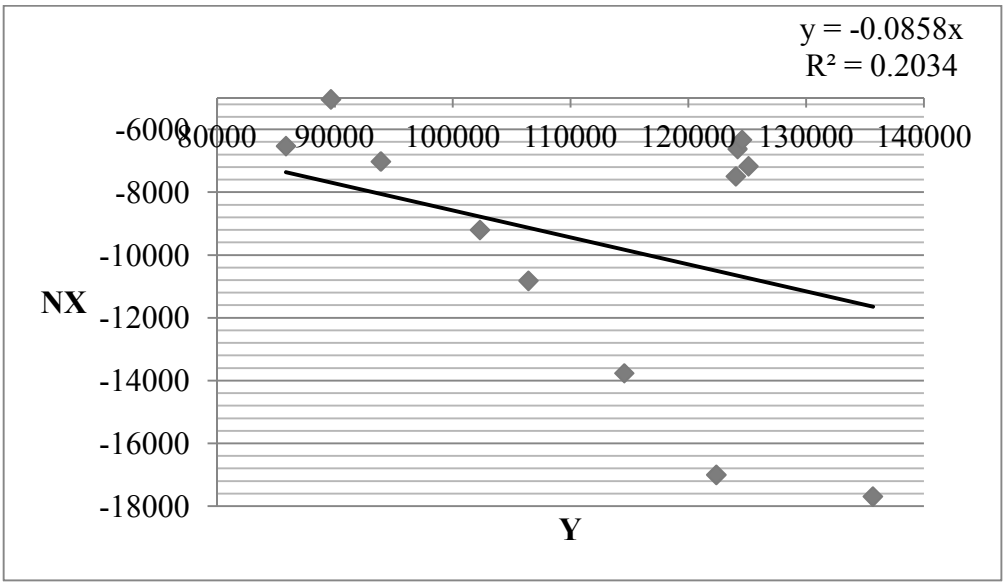

Figure 3. Net Exports dependence from GDP (mil. lei-2000)

From equation (60) we obtain that at an increase of 1000 million lei-2000 of GDP, Net Exports will decrease by an average of 85.8 million-2000.

5.5. The Determination of the Linear Regression $TR=\theta_Y Y$

During 2001-2012, government transfers (TR) have recorded the following values:

Table 9. Government Transfers of Romania during 2001-2012

Year	Government transfers (mil. current) TR	Government transfers (mil. lei-2000) TR
2001	-891.9	-649.1
2002	-1602.8	-945.3
2003	-4571.3	-2174.3
2004	-10366.2	-4287.4
2005	-8490.8	-3127.1
2006	-11536.1	-3834.6
2007	-14925.4	-4390.4
2008	8362.4	2204.2
2009	1660.9	411.1
2010	7041.7	1682.2
2011	4673.4	1042.4
2012	4931.6	1045.7

Source: INSSE

Because after a period of negative transfers (2001-2007) follows a reversal of direction caused by the entry of Romania into the European Union and labor migration to more economically developed countries, we perform regression analysis only on the period 2008-2012, government transfers marginal rate thus being determined much closer to the current trend.

The regression analysis for the period 2008-2012 (tables 5 and 9) provides the following results:

- The empirical correlation coefficient is $\rho=0.913128008>0.878$ (corresponding to a total of 5 values of exogenous variable) for a significance level of more than 0.95, so that the linear dependence between variables may exist.
- The R Square value=0.1137 means that only 11.37% of the total variance of the government transfers is explained by the variation in GDP, the remaining 88.63% being due to other factors.

- The Fisher-Snedecor statistics F=20.06778828 and $F_{0.05;1;4}$=0.004453, so how F> $F_{0.05;1;4}$ then the null hypothesis H_0 will be rejected with probability 0.95, so the coefficient θ_Y can be nonzero.
- Significance F=0.020740723<0.05 therefore it is possible that the value θ_Y be different from 0.
- P-value(θ_Y)=0.010992314 so GDP affects government transfers.
- Studying the interval [Lower95%, Upper95%] we have that $\theta_Y \in$[0.003879799,0.016528517] with a probability greater than 0.95.

Therefore after the regression analysis, we obtain that, on average, the dependence of government transfers on GDP is:

(62) TR=0.010204158·Y

where:

(63) θ_Y=0.010204158

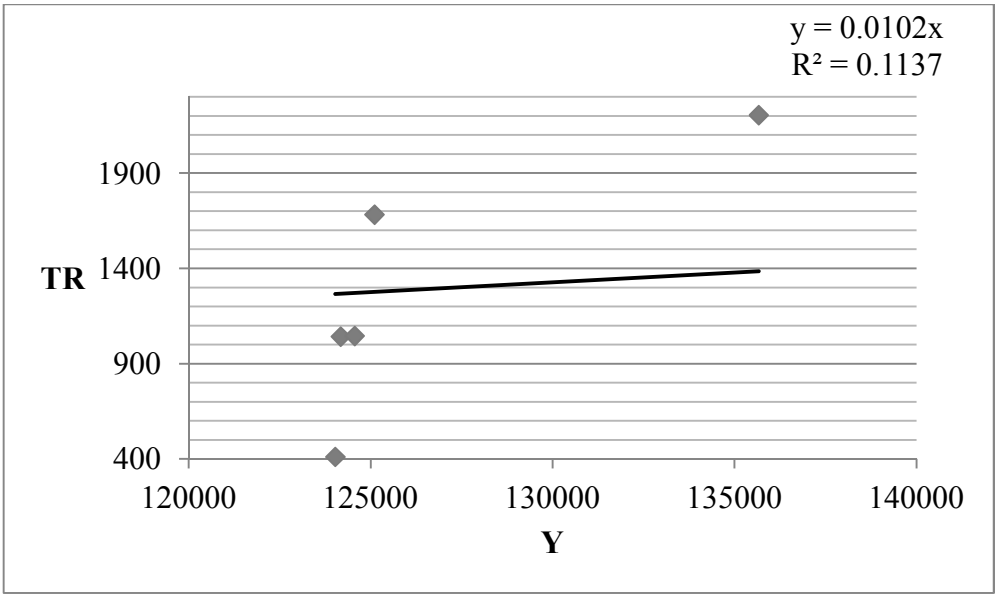

Figure 4. Government transfers dependence from GDP (mil. lei-2000)

From equation (62) we obtain that at an increase of 1000 million lei-2000 of GDP, the government transfers will increase, on average, by 10.2 million lei-2000.

5.6. The Determination of the Linear Regression $TI=ri_Y Y+T_0$

During 2001-2012, the level of taxes (TI) has the following values:

Table 10. Taxes during 2001-2012

Year	Taxes (mil. current) TI	Taxes (mil. lei-2000) TI
2001	14567.2	10602.1
2002	17959.5	10592.4
2003	25428.2	12094.6
2004	32429.9	13412.9
2005	36945.7	13607.0
2006	63137.0	20986.6
2007	74933.1	22042.2
2008	92479.6	24376.0
2009	84884.5	21008.5
2010	90847.7	21703.1
2011	104687.0	23351.3
2012	114044.6	24181.1

Source: INSSE

The corresponding regression analysis of data from tables 5 and 10 (in million-2000) provides the following results:

- The empirical correlation coefficient is $\rho=0.963749>0.576$ for a significance level of more than 0.95, so that the linear dependence between variables may exist.
- The R Square value=0.9288 means that 92.88% of the total variance of the taxes is explained by the variation in GDP, the remaining 7.12% being due to other factors.
- The Fisher-Snedecor statistics F=130.473850 and $F_{0.05;1;10}=0.004134$, so how $F> F_{0.05;1;10}$ then the null hypothesis H_0 will be rejected with probability 0.95, so at least one of the coefficients can be nonzero.
- Significance $F=4.6389661\cdot10^{-7}<0.05$ therefore it is possible that at least one coefficient to be different from 0 with a probability greater than 0.95.

- P-value(θ_Y)=0.010992314 so GDP affects government transfers.
- Studying the interval [Lower95%, Upper95%] we have that $\theta_Y \in [0.003879799,0.016528517]$ with a probability greater than 0.95.
- P-value(T_0)=0.00018686 and P-value(ri_Y)=$4.63896615 \cdot 10^{-7}$, so both independent of income taxes and GDP influence (with a higher probability than 0.95) the collection of taxes.
- Intervals [Lower95%, Upper95%] are: $T_0 \in [-25992.56186,-11461.97351]$, $ri_Y \in [0.39228,0.27617]$.

Following regression analysis, we obtain that, on average, the GDP dependence of taxes is:

(64) $TI=0.32825 \cdot Y-18727.26768$

where:

(65) $ri_Y=0.32825$

(66) $T_0=-18727.26768$

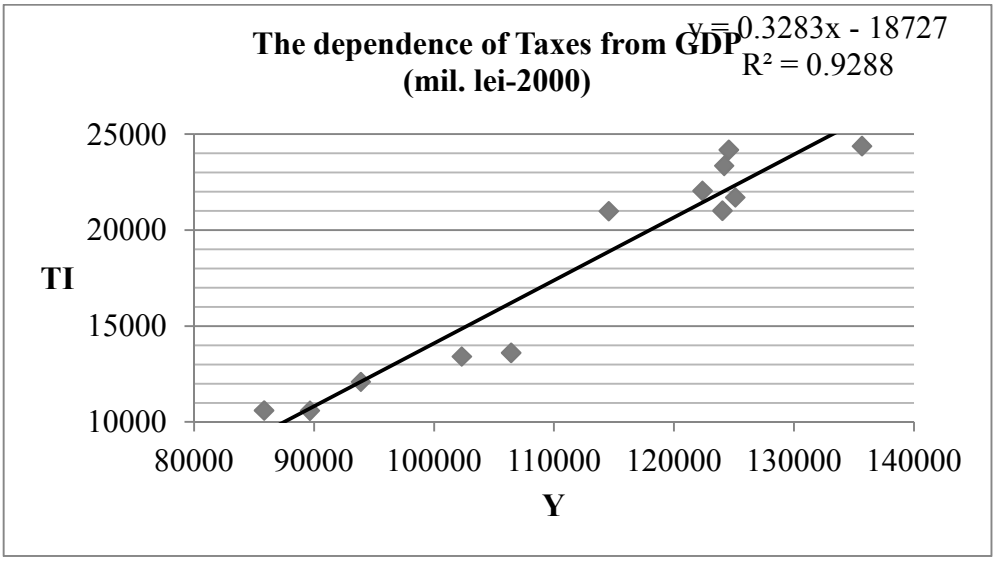

Figure 5.

From equation (64) we obtain that at an increase of 1000 million lei-2000 of GDP, taxes will increase, on average, with 328.25 million-2000 (in the hypothesis of independent of income taxes constancy).

5.7. The Determination of the Linear Regression $MD=md_Y Y+m_r r$

During 2001-2012, the demand for currency in the Romanian economy (MD) had the following values:

Table 11. The Money Demand in the Period 2001-2012

Year	The money demand (mil. current) MD	The money demand (mil. lei-2000) MD
2001	4643.90	3379.8
2002	6547.09	3861.4
2003	9209.40	4380.3
2004	12700.50	5252.9
2005	27633.77	10177.4
2006	39275.04	13055.0
2007	62200.55	18296.8
2008	87864.34	23159.5
2009	81441.49	20156.4
2010	78946.89	18860.0
2011	81308.22	18136.4
2012	87601.43	18574.3

Source: INSSE

The corresponding regression analysis of data from Tables 5, 6 and 11 (in million-2000) provides the following results:

- The empirical correlation coefficient is $\rho=0.967385979>0.576$ for a significance level of more than 0.95, so that the linear dependence between variables may exist.
- The Fisher-Snedecor statistics $F=72.92486928$ and $F_{0.05;2;10}=0.051557$, so how $F> F_{0.05;2;10}$ then the null hypothesis H_0 will be rejected with probability 0.95, so at least one coefficient can be nonzero.
- Significance $F=2,75102\cdot10^{-6}<0.05$ therefore it is possible that the values md_Y and m_r be different from 0.

- P-value(md_Y)=$1.60695 \cdot 10^{-6}$ and P-value(m_r)=0.013059076 means that the level of GDP and the real interest rate influences the level of money demand with a degree of confidence over 95%.
- Studying the interval [Lower95%, Upper95%] we have that $md_Y \in [0.123318438,0.194135677]$, $m_r \in [-289187.5838,-43287.96074]$ with a probability greater than 0.95.

After the regression analysis, we obtain that, on average, the money demand from GDP and the real interest rate is:

(67) $MD=0.158727057 \cdot Y-166237.7723 \cdot r$

where:

(68) $md_Y=0.158727057$

(69) $m_r=-166237.7723$

From equation (67) we obtain that at an increase of 1000 million lei-2000 of GDP, given a constant real interest rate, the demand for money will increase, on average, with 158.7 million-2000. Also, in terms of GDP constant, an increase in the real interest rate by 0.01 will generate a decrease in demand for currency by 1662.4 million lei-2000.

5.8. The Determination of Static Equilibrium during 2001-2012

In previous sections, we saw that model parameters were determined in the linear regressions with one or two variables based on the dynamics of the main economic indicators in the period 2001-2012. Due to high levels of correlation coefficients, we can consider constant parameter values so determined. However in the analyzed period, money has where gone considerable fluctuations from year to year (with extremes -12.97% - 2009 and -93.75% - 2005) with an annual average of 19.59%. As a result of this situation, we will determine the static equilibrium values of the output, the real interest rate and other economic indicators, comparing them with the actual values recorded, all calculations being performed for comparability in the currency of 2000.

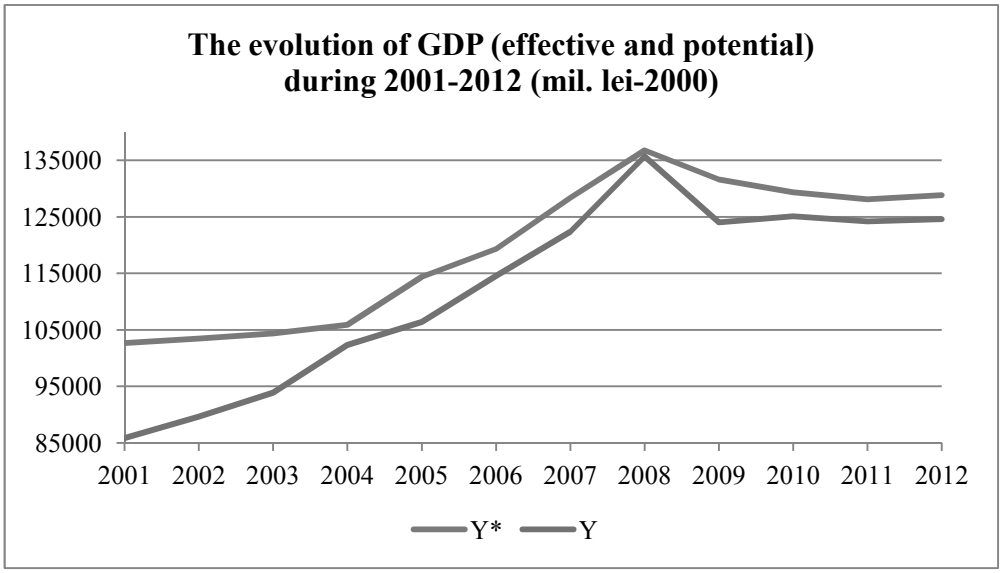

Figure 6.

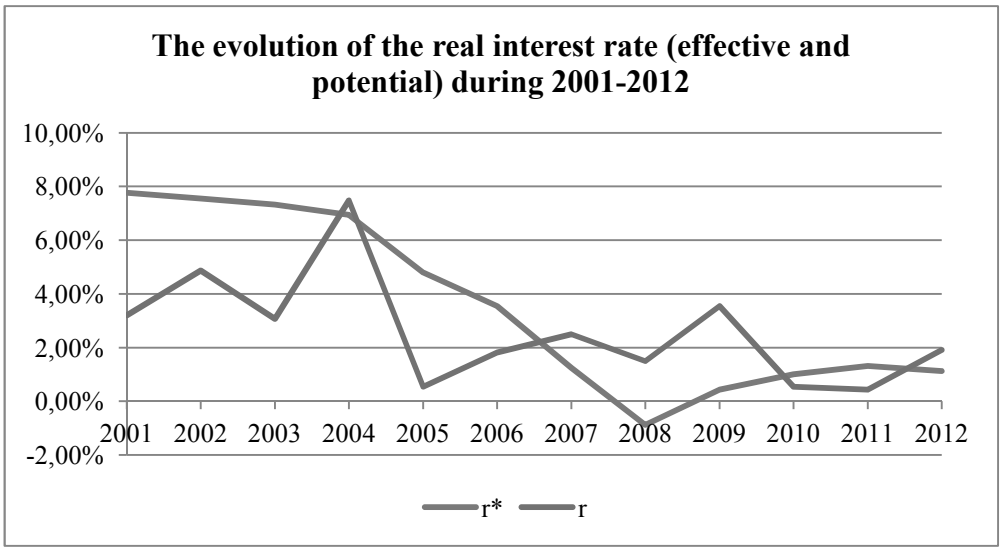

Figure 7.

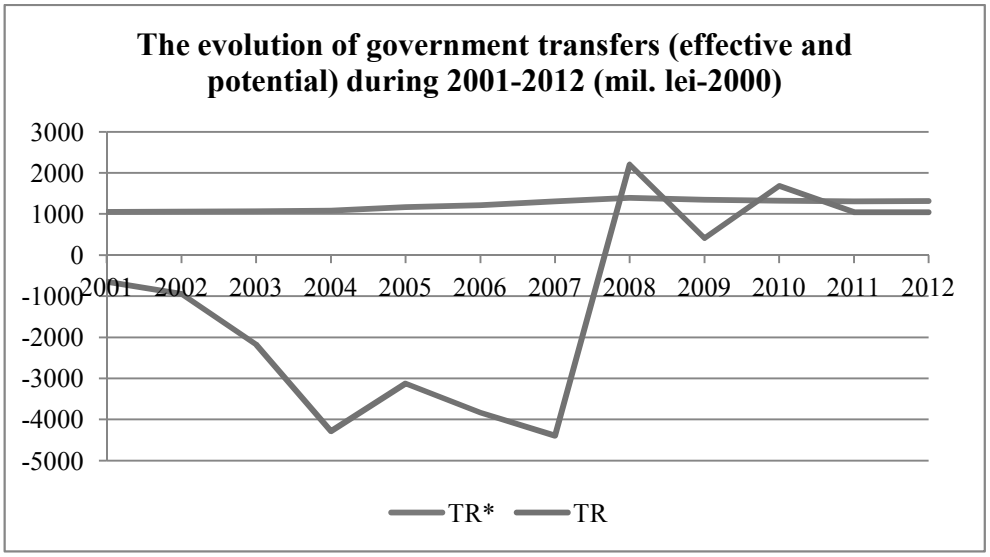

Figure 8.

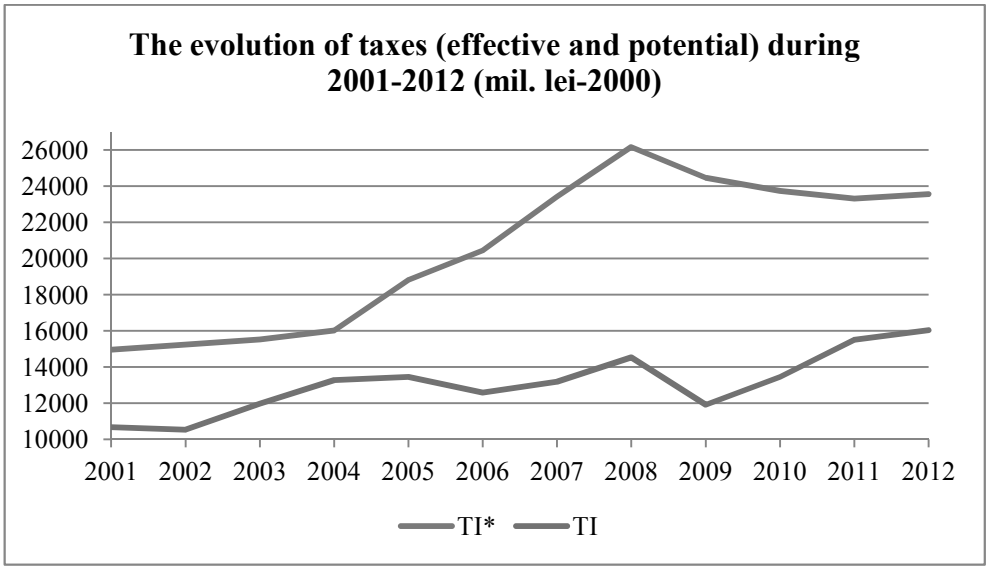

Figure 9.

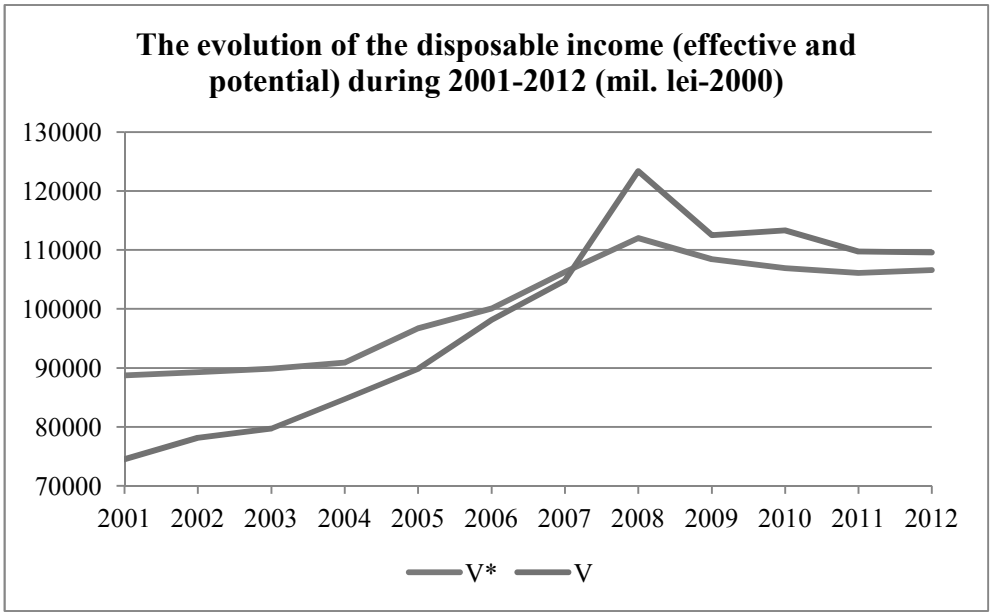

Figure 10.

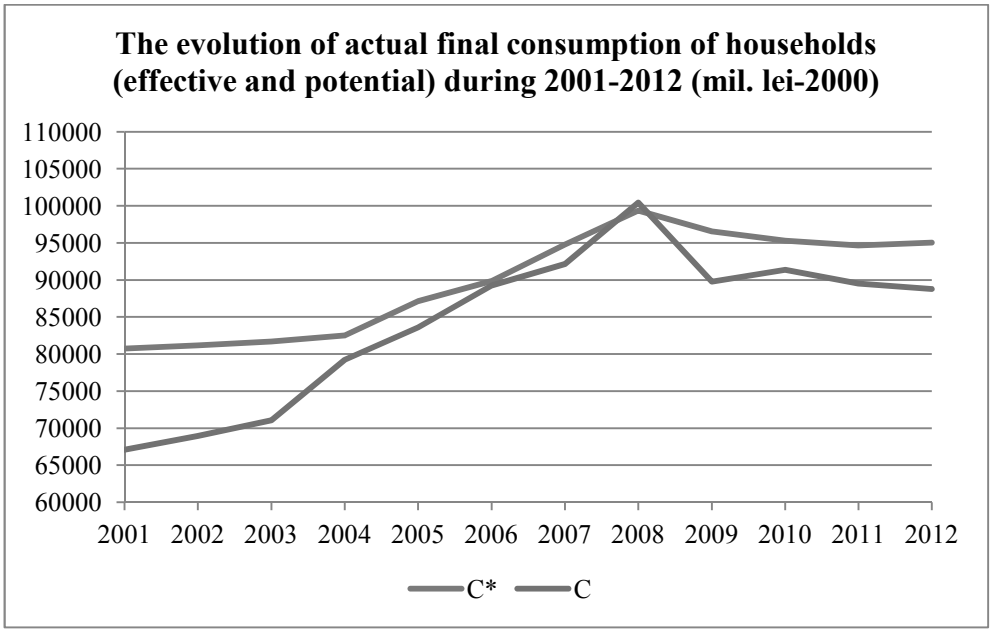

Figure 11.

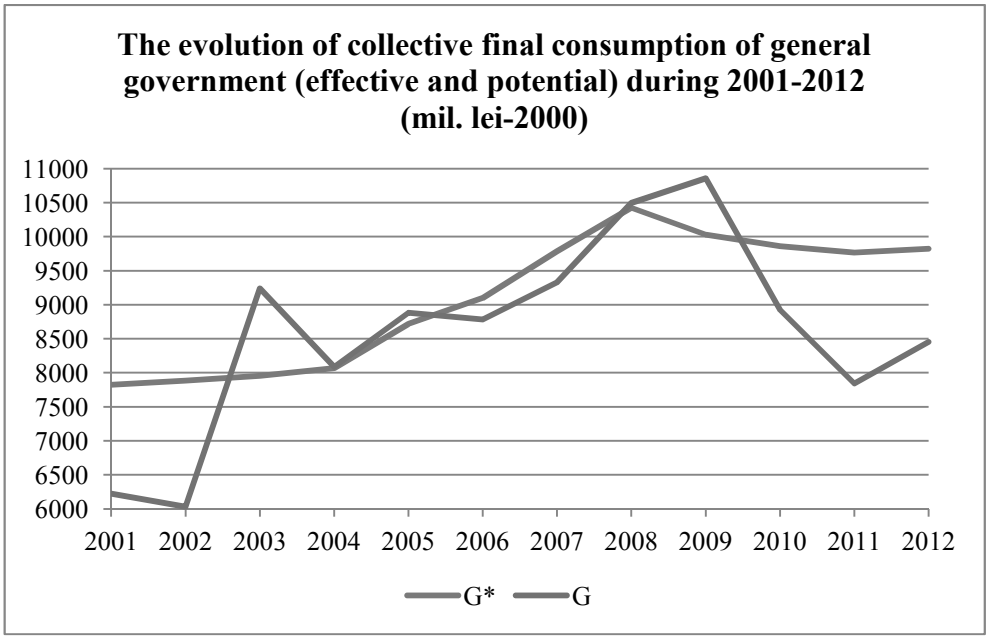

Figure 12.

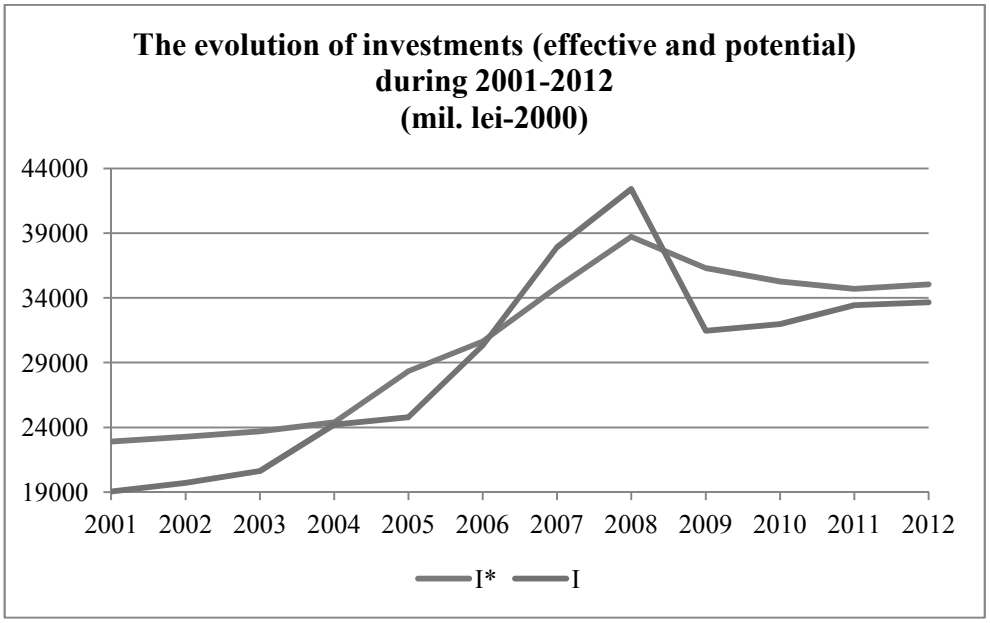

Figure 13.

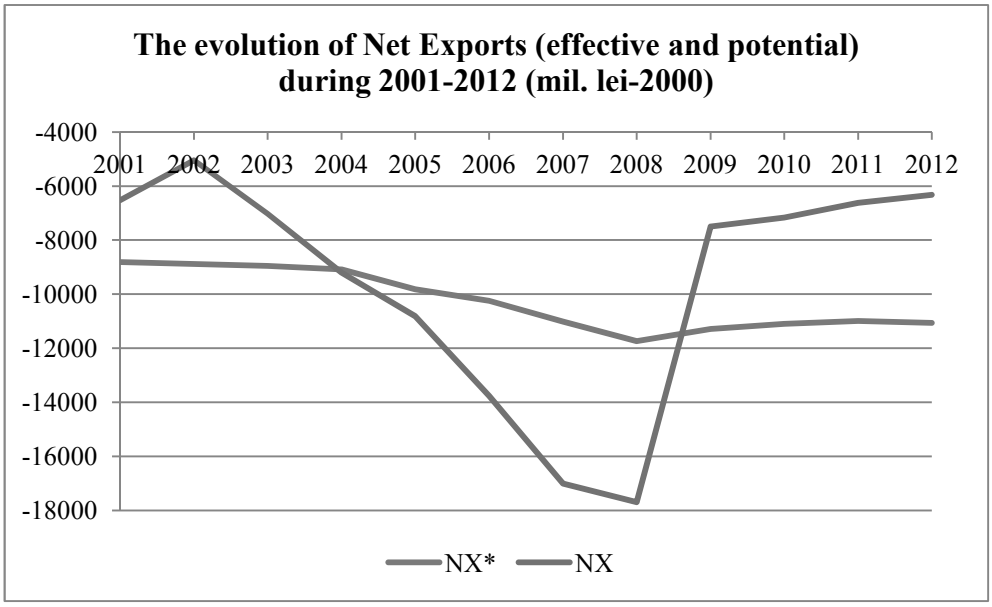

Figure 14.

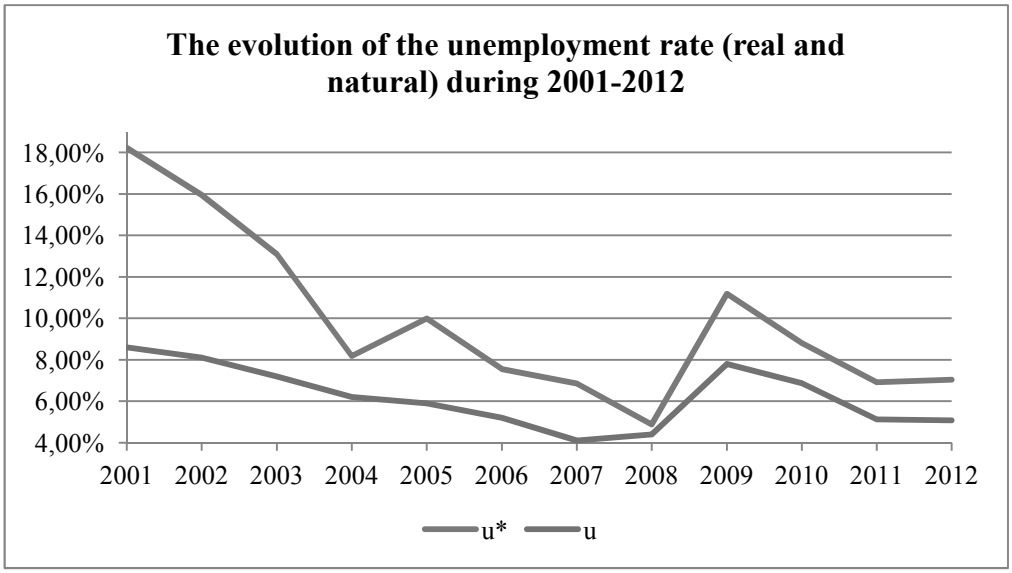

Figure 15.

We will divide the length of this period in three equal intervals, corresponding to enhance economic stages, expansion and the crisis. Coincidentally or not, these periods coincide with election cycles that have distinct developmental strategies, unfortunately less in line with the requirements of economic theory.

1. Period 2001-2004

Table 12. Main Economic Indicators of Romania in 2001-2004

Year/ Indicator	2001			2002		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	85841.1936	102636.4617	83.64%	89658.25153	103467.3315	86.65%
r	3.20%	7.77%	41.16%	4.87%	7.56%	64.49%
TR	-649.1266376	1047.318658	-61.98%	-945.3169419	1055.796985	-89.54%
TI	10687.88537	14963.38707	71.43%	10536.6154	15236.12202	69.16%
V	74504.18159	88720.39325	83.98%	78176.31919	89287.0065	87.56%
C	67086.82678	80726.13279	83.10%	68944.02648	81179.77873	84.93%
G	6225.909753	7823.430952	79.58%	6029.491907	7886.763738	76.45%
I	19058.36972	22894.44344	83.24%	19726.20724	23279.63404	84.74%
NX	-6529.912664	-8807.545515	74.14%	-5041.4741	-8878.844975	56.78%
u	8.60%	18.23%	47.19%	8.10%	15.95%	50.78%
M	3379.8			3861.4		
Year/ Indicator	**2003**			**2004**		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	93904.04246	104362.6415	89.98%	102310.9459	105868.0835	96.64%
r	3.07%	7.33%	41.89%	7.48%	6.95%	107.65%
TR	-2174.283379	1064.932869	-204.17%	-4287.441089	1080.294637	-396.88%
TI	11978.70185	15530.00956	77.13%	13279.437	16024.17438	82.87%
V	79751.05723	89897.56477	88.71%	84744.0678	90924.20378	93.20%
C	71058.29958	81668.60824	87.01%	79203.63113	82490.56327	96.02%
G	9238.266718	7955.008447	116.13%	8088.159881	8069.760278	100.23%
I	20628.5094	23694.69901	87.06%	24216.75042	24392.62074	99.28%
NX	-7021.033239	-8955.674231	78.40%	-9197.595544	-9084.860771	101.24%
u	7.20%	13.09%	54.98%	6.20%	8.18%	75.83%
M	4380.3			5252.9		

The first remark, after the analysis of the Table 12, is that in the period of economic consolidation, the effective GDP was approach continuously to the potential, from 83.64% in 2001 to 96.64% in 2004.

In the period 2001-2003, the real interest rate was much below potential, with differences of 3-4%, confirming the procyclical policies reported in the previous chapter when the macroeconomic analysis was based on official statistics. The negative gap between real interest rate and that potential, led to the beginning of the Romanian economy overheating that boosted the next period (2005-2008). Linked to this negative phenomenon, the final consumption of households increased much exaggerated, reaching a potential relationship to 83.1% in 2001 and to 96.02% in 2004.

Tax revenue (taxes) is not close to the potential threshold, equally evolved GDP. Thus, if in 2001 the ratio $GDP_{effective}/GDP_{potential}$ was 83.64%, the ratio $TI_{effective}/TI_{potential}$ was only 71.43%, while the end of the period in which $GDP_{effective}/GDP_{potential}$=96.64% the ratio $TI_{effective}/TI_{potential}$ was 82.87%, the gap between the two ratios increasing. These differences can be explained either by inefficient collection system at national level or on account of tax evasion growing.

Relative to government spending stands, at first sight, a paradoxical fact. If in the first two years they were placed at odds of 79.58% and 76.45% of the potential, in the last two years they have exceeded the maximum level stood at 116.13% and 100.23% of the economic balance dictates. The explanation is simple but, as we shall see in the next period, the phenomenon is characteristic of electoral timetables.

The ratio of effective investments to potential reveals a fairly close correlation relative to GDP growth (the effectiveness remaining questionable).

The effective unemployment rate in 2001-2003 was much below the natural (as defined above, relative to the potential level of GDP) stood at about half the forecast model. In 2004, the difference between the two rates has decreased noticeably (6.20% - effective rate to 8.18% - the natural rate). On the other hand, during this period, the analysis based on the National Institute of Statistics and the Ministry of Labor reveals a discrepancy between the relative dynamics of the unemployed and the employed in the economy.

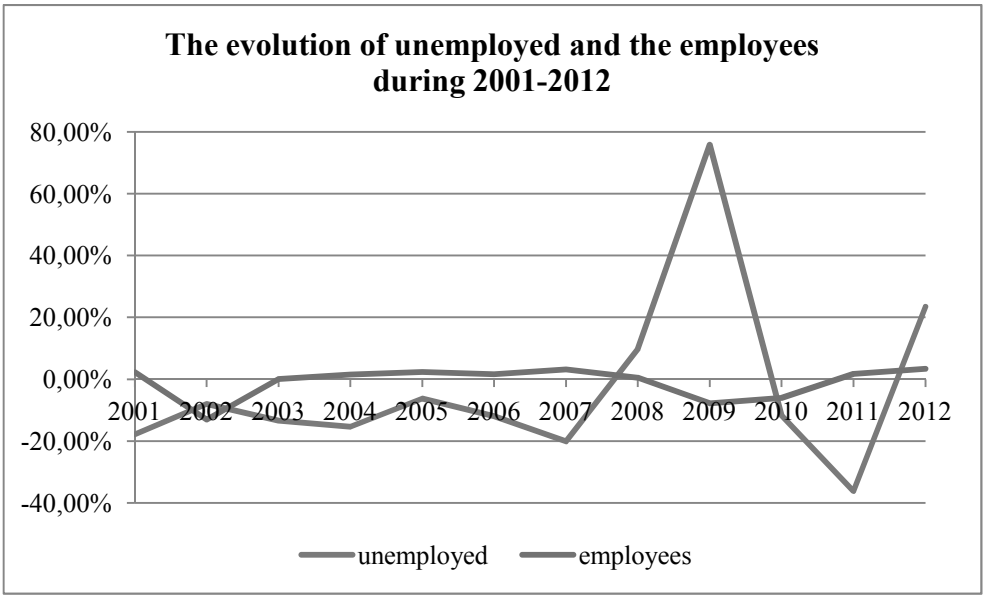

Figure 16.

Source: INSSE, Labor Ministry

In the analyzed period, the average of the relative dynamics of the number of unemployed was -13.65% (representing thus a decrease in the number of unemployed), while the average growth in the number of employees was only -2.34% (the number of jobs reducing therefore with an average 2.34% every year). The question is the absorption of the unemployed into the labor market, in the period where review has been a very big gap.

On the one hand, the rigidity and inflexibility recorded at all levels of the labor market and the high level of taxes led to a reduced employability in this period. On the other hand, a regression analysis between dynamic collection of taxes and the evolution of unemployment shows a very interesting situation. Regression equation:

$$\frac{\Delta TI}{TI} = -0.2470 \frac{\Delta PS}{PS} + 0.03916$$

where: TI – collected taxes, and PS – number of unemployed persons show an inverse dependence between tax collection and increased unemployment. At first glance, it seems a normal phenomenon, because the income from unemployment benefits being greatly reduced compared to the period of employment, the rates will decrease. From the regression equation, we note that at an increase in the number of unemployed, collecting taxes decreased by 24.7%. On the other hand, the level of taxation, in 2001-2004, showed an average of 12.54%. The difference

between these two values can have two causes: either the amplification of the phenomenon of emigration (and therefore a segment of the population goes out of the system) or amplification of "black" work, justifying also the employability gap reported above.

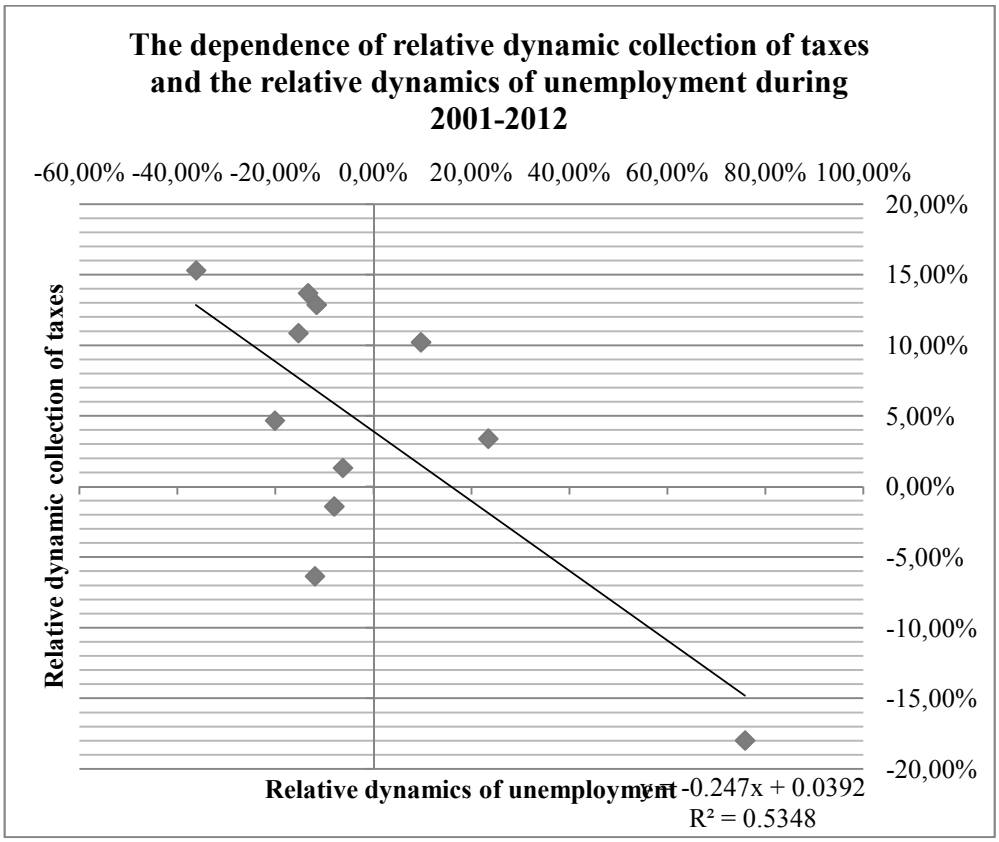

Figure 17.

2. Period 2005-2008

Table 13. Main Economic Indicators of Romania in 2005-2008

Year/ Indicator	2005			2006		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	106421.2703	114364.448	93.05%	114561.3451	119329.0557	96.00%
r	0.54%	4.80%	11.28%	1.82%	3.54%	51.45%
TR	-3127.14081	1166.99288	-267.97%	-3834.58243	1217.65252	-314.92%
TI	13453.98304	18813.12559	71.51%	12597.96992	20442.76947	61.63%
V	89840.14641	96718.31534	92.89%	98128.79278	100103.9387	98.03%
C	83577.28346	87129.48615	95.92%	89229.48754	89840.10808	99.32%
G	8879.432869	8717.392904	101.86%	8784.062685	9095.818509	96.57%
I	24781.4897	28331.52852	87.47%	30310.85484	30633.11664	98.95%
NX	-10816.93577	-9813.959534	110.22%	-13763.05993	-10239.98755	134.41%
u	5.90%	9.99%	59.09%	5.20%	7.55%	68.87%
M	10177.4			13055.0		
Year/ Indicator	**2007**			**2008**		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	122371.7164	128372.8227	95.33%	135665.8673	136762.4991	99.20%
r	2.50%	1.25%	199.78%	1.49%	-0.87%	-170.96%
TR	-4390.42539	1309.93655	-335.16%	2204.18156	1395.54613	157.94%
TI	13185.39574	23411.40682	56.32%	14532.24725	26165.33741	55.54%
V	104795.8953	106271.3525	98.61%	123337.8016	111992.7079	110.13%
C	92137.13054	94777.9068	97.21%	100453.3921	99358.57913	101.10%
G	9328.837659	9785.176714	95.34%	10493.05766	10424.67707	100.66%
I	37904.8138	34825.79979	108.84%	42409.59294	38715.24705	109.54%
NX	-16999.0656	-11016.06058	154.31%	-17690.17541	-11736.00411	150.73%
u	4.10%	6.85%	59.86%	4.40%	4.87%	90.32%
M	18296.8			23159.5		

The analysis of Table 13 shows that in the period of economic expansion began in 2004, the actual GDP was close to the potential from 93.05% in 2005 to 99.20% in 2008.

Contrary to economic theory and practice, providing that in periods of economic expansion the actual GDP must exceed the potential and the actual unemployment rate being below the natural rate in Romania was a paradoxical situation. If actual unemployment rate remained below the natural (5.90% versus 9.99% - 2005, 5.20% to 7.55% - 2006, 4.10% to 6.85% - 2007, 4.40% to 4.87% in 2008), the actual GDP has remained below the potential.

On the other hand, relative to the evolution of the number of employees in relation to ownership, one can speak of two distinct periods. In the first of these (2005-2006) the number of employees in the public sector fell considerably from year to year (8.23% - 2005 3.68% - 2006), while the private sector has increased staff 7.89% in 2005 and 5.32% in 2006. In the second period (2007-2008) the budget unit increased by 1.67%, while in 2008 and to decrease 0.68%. Meanwhile, growth in private units' staff maintained the trend falling to 6.01% in 2007 and 5% in 2008. On the whole employed population is observed, however, a continuing decline in the public share of 32.79% in 2005 to 28.81% in 2008.

In absolute values, it is observed that the number of employees made redundant in the public sector over this period far below of the new employees in the private sector. Thus, in 2005, 134 thousand people came out of the public system corresponded to 224000 new private sector jobs, in 2006: 55000 exits from the public to the private face to 163000 entries, in 2007 there was excess job employment in both sectors, as in 2008 to register 10000 departures from the public and 171000 private arrivals.

Because the actual unemployment rate remained below the natural rate, and the actual GDP was below the potential, we consider that inputs were either poorly allocated or insufficiently. In support of this testimony is the dynamic evolution of the most important sector of the economy, namely industry, where the number of employees decreased continuously in the period, which means that staffing were made in sectors with low added value.

Relative to the real interest rate can be observed again two periods. The first of these (2005-2006) it was far below the potential rate (0.54% versus 4.80% in 2005 and 1.82% to 3.54% in 2006) which led to the easing lending, as reflected in the evolution of household consumption from a ratio of 95,92% of potential in 2005, reached almost maximum in 2006 - 99.32% (being uncorrelated with the actual GDP share in the potential of only 96%). The explanation is very simple, following the evolution of net exports. From a trade deficit of 10817 million lei-2000 recorded in 2005, in 2006 it increased to 13763 million lei-2000, thus encouraging lending was made not to stimulate domestic production, but in the purchase of imported products.

The second period (2007-2008) can be described as a blending of opposites. On the one hand, the restrictive policy of the National Bank which used benchmark

interest rate increase (from the nominal 7.46% or actual 2.50% in 2007 compared to the potential of 1.25%, in 2008 recorded 9.46%, 1.49% and -0.87% respectively) could not counteract the relaxation of fiscal policy, budgetary and revenue, resulting in wage increases above productivity gains. Turning to household consumption, it has reached an alarming rate in 2008 of 101.10% of the potential.

Government spending after a timid decline in 2006, they beginning to have an upward trend, culminating in 2008 with a percentage of 100.66% compared to the potential, due, as mentioned above, to electoral calendars.

With the accession of Romania to the European Union, the transfers experienced a spectacular development from negative values recorded until 2007, being located at a positive level so far.

Although, as of 1 January 2005, the flat tax was introduced and despite the fact that absolute revenues from taxes increased from year to year, the ratio to the potential decreased continuously from 71.51% in 2005 to 55.54% in 2008. Easing the tax burden led to a series of consequences for businesses and individuals. Investment growth both in absolute terms and as a percentage of potential was apparently positive, however being not reflected in the actual GDP growth, which means that it has not followed the principle of economic efficiency. Relative to population, lower income tax rates coupled with wage increase led to an artificial increase in disposable income (110.13% of potential), which resulted, as we have seen above, in an oversized consumer based mainly on imports. All this have a result in reducing the country's competitiveness indicators externally.

3. Period 2009-2012

Table 14. Main Economic Indicators of Romania in 2009-2012

Year/ Indicator	2009			2010		
	effective	potential	effective / potential	effective	potential	effective / potential
Y	124029.6072	131581.1957	94.26%	125107.712	129344.5693	96.72%
r	3.54%	0.44%	807.57%	0.55%	1.00%	54.41%
TR	411.0648146	1342.675293	30.62%	1682.226937	1319.852405	127.46%
TI	11917.61269	24464.56262	48.71%	13450.91143	23730.38488	56.68%
V	112523.0593	108459.3083	103.75%	113339.0275	106934.0369	105.99%
C	89778.86712	96529.64363	93.01%	91364.48578	95308.46991	95.86%
G	10858.45688	10029.7339	108.26%	8923.922806	9859.247784	90.51%
I	31465.89907	36313.19892	86.65%	31987.70634	35276.30074	90.68%

NX	-7492.546611	-11291.38077	66.36%	-7168.402883	-11099.4491	64.58%
u	7.80%	11.18%	69.79%	6.87%	8.80%	78.10%
M	20156.4			18860.0		
Year/ Indicator	**2011**			**2012**		
	effective	potential	effective / potential	effective	potential	effective / potential
Y	124178.2021	128096.1724	96.94%	124561.7606	128851.6625	96.67%
r	0.43%	1.32%	32.92%	1.92%	1.13%	169.61%
TR	1042.438752	1307.113565	79.75%	1045.658079	1314.822706	79.53%
TI	15508.70219	23320.59571	66.50%	16032.98568	23568.58709	68.03%
V	109711.9386	106082.6903	103.42%	109574.433	106597.8982	102.79%
C	89521.34053	94626.85872	94.60%	88781.40882	95039.34815	93.42%
G	7840.083394	9764.089133	80.30%	8453.55485	9821.676124	86.07%
I	33438.47473	34697.54492	96.37%	33655.40727	35047.78955	96.03%
NX	-6621.696577	-10992.32038	60.24%	-6328.610381	-11057.15127	57.24%
u	5.12%	6.92%	74.00%	5.08%	7.04%	72.18%
M	18136.4			18574.3		

The analysis of this period will be conducted on three times: 2009, 2010-2011 and 2012 due to their peculiarities from a mix of economic policy and political factor.

In retrospect, 2009 may be considered a denial of economic realities by policymakers, although the crisis was visible since its beginning. This approach, coupled with electoral character of the period, led to increased depression phase.

The macroeconomic indicators deceleration was due to the insustainability of the main components of GDP: consumption and investment, i.e. an excessive aggregate demand.

Thus, in terms of growth over the previous year, the household consumption decreased by 10.63%, the share face potential consumption (derived in the mathematical model) being 93.01%. Relative to investments, there is also a reduction in their levels of 25.8% compared to 2008, the share to potential be only 86.65%. The decrease in trade deficit by 57.65% (from 17 690 million lei-2000 in 2008 to 7493 million lei-2000 in 2009) was based on the reduction, especially in imports (to an extent greater than falling exports). On the other hand, the consumption reduce in Romania, as we saw above, very much dependent on

imports and not based only to a small extent on domestic saving, could not be offset by lower trade deficit.

The flagrant violation of any economic theory (economic policy adopted in 2009 cannot be assigned, with one exception, even in the liberal models supported, but even in the Keynesian) is reflected both in terms of monetary, fiscal, and in the budget. Thus, the real interest rate increased from 1.49% to 3.54%, with the decrease of foreign capital flows which affect the investment sector that dropped from 42410 million lei-2000 in the year 2008 to 31466 million lei-2000 in 2009. Because of the economic crisis of the real economy experienced, a large number of firms have closed or suspended operations (particularly in the construction sector), the unemployment rate increased from 4.40% to 7.80%, and consumption decreased by 10.63%, the main funding sources of the state (tax revenue) decreasing significantly by 17.99% compared to 2008.

Despite this cruel reality, government spending increased by 3.48%, mainly due to increased overall budget unit with 0.62% (4.23% in public administration, education and health). In parallel, production personnel in industry and agriculture - the main sectors that could improve net exports - fell by 19.14%.

Interestingly, is the fact that, opposite to the inertia public sector, private sector started adjusting since 2008, feeling the first signs of the crisis long before declaring it official.

The period 2010-2011 can be called the period of recognition and awareness of the crisis, with more or less economic stability measures.

Monetary policy is one that, in this period, was decisive for the evolution of the main macroeconomic indicators. Thus real interest fell, first, from 3.54% in 2009 to 0.55% in 2010 and becoming in 2011: 0.43%. This was reflected in the investment immediately began a slight upward trend (increase of 1.66% in 2010 and 4.54% in 2011).

With increasing taxation (16.95% - 2009, 17.35% - 2010, 18.80% - 2011) the taxes collected increased significantly from 12.87% (2010 face to 2009), reaching to 15.30% (2011 face to 2010). High taxation put his mark on disposable income and thus on consumption that experienced after a timid increase of 1.77% in 2010, a decrease of 2.02% in 2011, returning to its level of 2009. These austerity measures, considered by authorities at the time, needed affect Romanian main engine of economic growth (albeit unsustainable) – consumption.

A positive aspect of this period is the reducing of the trade deficit (decrease of 4.33% in 2010 compared to 2009 and by 7.63% in 2011 compared to 2010) supported by strong exports (whose development was the increase 28.84% in 2010 and to 21.26% in 2011) compared to imports whose dynamics, however, was lower (21.88% in 2010 and 18.05% in 2011).

These percentages creates a misleading appearance due to the fact that the analysis in depth of the phenomenon reveals that the evolution of exports was due, on the one hand, to the exchange rate (RON/EUR, fig.18) which has had a trend upward and, on the other hand, to the economic difficulties of the European Union - Romania's main trading partner, which allowed better penetration on the foreign market local goods, comparatively cheap.

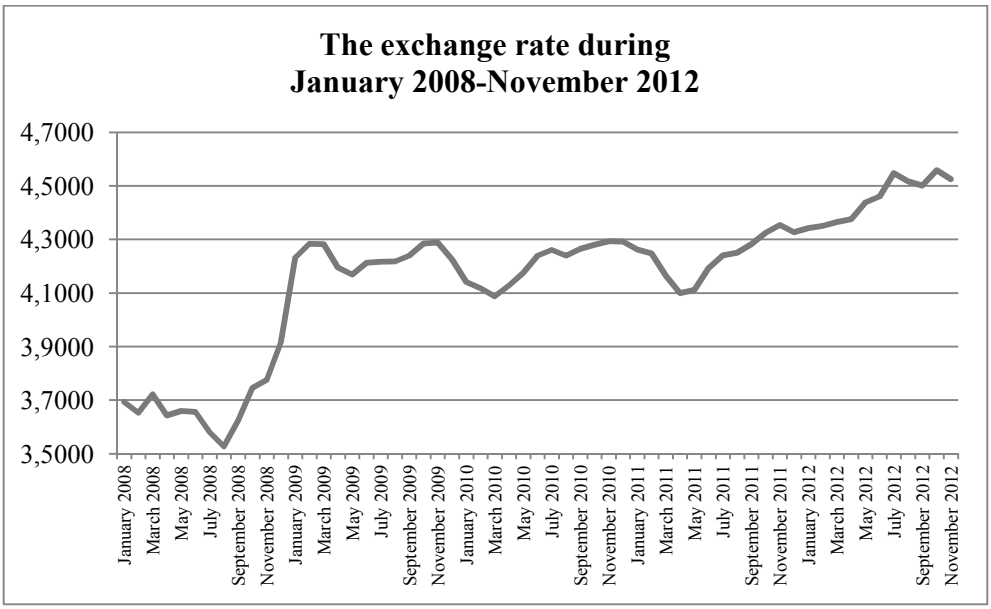

Figure 18.

Source: INSSE

A second measure, which would have been welcome, was to reduce government spending to 17.82% in 2010 and 12.15% in 2011. But studying the dynamics of public sector employees in a decrease of only 5%, the difference is actually reflected in the decline in public-sector wages, which inevitably led to a decline in consumption.

The year 2012 was distinguished by a mix of policies, primarily due to changes in political strategy. After four months of liberal policy, Romania has focused (after tipping the political balance of forces) on a strategy essentially social-democratic. Political instability, reflected by twists and power relations, as well as feed-back from the European Union have led to developments weak, although positive, the economic performance.

The GDP growth was modest (after three years of economic crisis, during which a number of states have overcome difficulties) of 0.3% respecting 2011, household consumption fell by 0.83%, investments with a modest rate (compared to the

previous year) growth of 0.65%, all due to higher real interest rate from 0.43% to 1.92%.

The trade balance continues the trend of deficit reduction to 4.43% respecting to 2011.

In parallel, the collection of taxes has increased by 3.38%, but the increasing of the government spending; without an economic justification, with 7.82% (consisting primarily of salary increase) was due to the electoral calendar.

During this period (2010-2012) the unemployment rate experienced a continuous decline from 6.87% to 5.08%.

From the foregoing, it emerges that is essential to the conclusion that it cannot be a visible progress without high investments. On the other hand, the problem is that the sources of funding for the various projects. With the accession to the European Union have been allocated sufficient funds to start serious investment projects. Unfortunately, due to excessive bureaucracy and a coordinating effective device for writing projects, the absorption rate was the lowest of all European countries, with an average of 16.51% during 2007-31 March 2013, far below the 33.36% European. Also, in recent years, the rate of absorption continuously decreased from 15.08% in 2011 to 11.47% in 2012.

5.9. The Analysis of Dynamic Equilibrium

The desire of each economy is to reach potential GDP when all inputs are used to the maximum. On the other hand, the balance cannot be achieved instantly with differences between aggregate demand and output, and between demand and supply of money. Following these considerations, the dynamic equations (12) and (13) study the time variation of just two main indicators of economy namely GDP and real interest rate.

In section 4, we determined the temporal variations, depending on the sign of the expression: $\Delta=(\alpha\chi+\beta m_r)^2+4\alpha\beta i_r m d_Y$ obtaining the equations (49)-(51).

To determine the parameters α and β we considered first, numerical approximations:

$\frac{dY}{dt}\Big|_{t=n} = \Delta Y = Y_n - Y_{n-1}$ where Y_n is the level of GDP at the time n, respectively

$\frac{dr}{dt}\Big|_{t=n} = \Delta r = r_n - r_{n-1}$ where r_n – real interest rate at time n. They were then

calculated, considering the ratios $\alpha_n = \frac{\frac{dY}{dt}}{D-Y}, \beta_n = \frac{\frac{dr}{dt}}{MD-M}$ the averages of α_n and β_n in the analyzed period, being considered like values for α and β respectively. There were thus obtained the following values:

(70) $\alpha=10.32709$

(71) $\beta=5.31171\cdot10^{-6}$

From the formulas (53), (54), (56), (58), (59), (61), (63), (65), (66), (68), (69) we saw that:

- $c_V=0.80063$
- $C_0=9694.17941$
- $g_Y=0.076224675$
- $in_Y=0.278413701$
- $i_r=-73144.11685$
- $\nu_Y=-0.085813028$
- $\theta_Y=0.010204158$
- $ri_Y=0.32825$
- $T_0=-18727.26768$
- $md_Y=0.158727057$
- $m_r=-166237.7723$

From the formulas (15), (17), we obtain:

(72) $\chi=1-c_V(1+\theta_Y-ri_Y)-g_Y-in_Y-\nu_Y=0.18519$

(73) $E=C_0-c_V T_0=24687.7379$

(74) $\Delta=(\alpha\chi+\beta m_r)^2+4\alpha\beta i_r md_Y=-1.48773$

As a result of the value of Δ we have the situation of dynamic equations (51).

The roots λ_1 and λ_2 present in the equations are:

(75) $\lambda_1=-1,39772+0,60986\cdot i$

(76) $\lambda_2=-1,39772-0,60986\cdot i$

from where:

(77) μ=-1,39772

(78) ν=0,60986

Substituting in the formulas (51), we get for the money supply, in the year 2012, M=18574.3261 (lei-2000):

(79) $Y=-4289.901993\cdot e^{-1.39772\cdot t}\cdot\cos(0.60986\cdot t)-435.9515998\cdot e^{-1.39772\cdot t}\cdot\sin(0.60986\cdot t)+ 128851.6625$

(80) $r=0.00372897\cdot e^{-1.39772\cdot t}\cdot\cos(0.60986\cdot t)+0.00098035\cdot e^{-1.39772\cdot t}\cdot\sin(0.60986\cdot t)+0.011296585$

The graphical representation of the function Y and r with respect to t is the following:

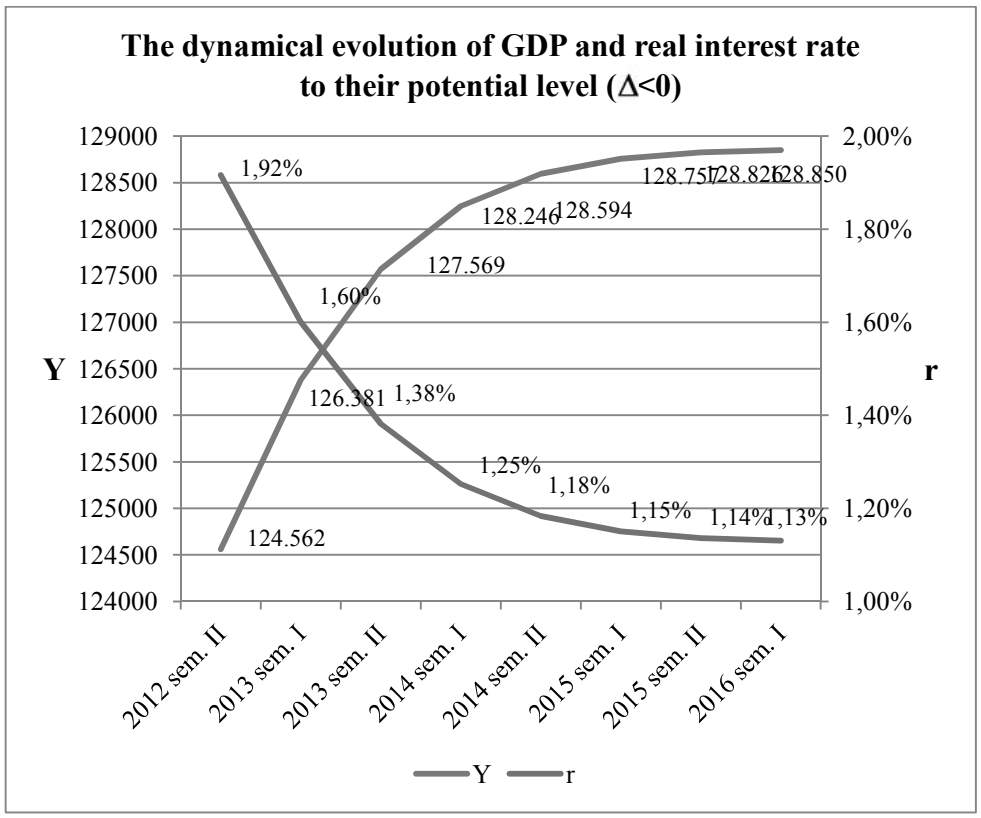

Figure 19.

The significance of formulas (79) and (80) and the evolution represented in fig.19 is that, given the constancy of model parameters, and the money supply (the year 2012), both GDP and the real interest will tend asymptotically to static equilibrium

levels determined by formula (24) as follows: Y^*=128851,6625 (lei-2000) and r^*=1.13%. It is noted that, after only two years, GDP reached 99.8% of the potential, while the real interest rate: 95.76% of the optimum. Therefore, in terms of constancy of all parameters, in order to achieve the potential of the economy, will be pursued that semis economic indicators above (Y and r) along with everyone else present in model to meet the theoretical values.

In semis the dynamic situation of the Romanian economy should be as follows:

Table 15. Main economic indicators of Romania (after the Dynamical Analysis) in 2013

Year/ Indicator	2013 sem. I			2013 sem. II		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	126381.3638	128851.6625	98.08%	127569.0389	128851.6625	99.00%
r	1.60%	1.13%	141.69%	1.38%	1.13%	122.33%
TR	1289.615388	1314.822706	98.08%	1301.734612	1314.822706	99.00%
TI	22757.70585	23568.58709	96.56%	23147.56292	23568.58709	98.21%
V	104913.2734	106597.8982	98.42%	105723.2106	106597.8982	99.18%
C	93690.59183	95039.34815	98.58%	94339.04953	95039.34815	99.26%
G	9633.378406	9821.676124	98.08%	9723.908551	9821.676124	99.00%
I	34015.56549	35047.78955	97.05%	34506.14996	35047.78955	98.45%
NX	-10845.16746	-11057.15127	98.08%	-10947.08545	-11057.15127	99.00%

Table 16. Main Economic Indicators of Romania (after the Dynamical Analysis) in 2014

Year/ Indicator	2014 sem. I			2014 sem. II		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	128245.7375	128851.6625	99.53%	128593.9959	128851.6625	99.80%
r	1.25%	1.13%	110.88%	1.18%	1.13%	104.80%
TR	1308.639752	1314.822706	99.53%	1312.193435	1314.822706	99.80%
TI	23369.69081	23568.58709	99.16%	23484.00743	23568.58709	99.64%
V	106184.6865	106597.8982	99.61%	106422.1819	106597.8982	99.84%
C	94708.51967	95039.34815	99.65%	94898.66497	95039.34815	99.85%
G	9775.489687	9821.676124	99.53%	9802.035571	9821.676124	99.80%
I	34789.20458	35047.78955	99.26%	34936.41041	35047.78955	99.68%
NX	-11005.15501	-11057.15127	99.53%	-11035.04012	-11057.15127	99.80%

Table 17. Main Economic Indicators of Romania (after the Dynamical Analysis) in 2015

Year/ Indicator	2015 sem. I			2015 sem. II		
	effective	potential	effective/ potential	effective	potential	effective/ potential
Y	128757.0432	128851.6625	99.93%	128825.6073	128851.6625	99.98%
r	1.15%	1.13%	101.86%	1.14%	1.13%	100.58%
TR	1313.857196	1314.822706	99.93%	1314.556834	1314.822706	99.98%
TI	23537.52809	23568.58709	99.87%	23560.03439	23568.58709	99.96%
V	106533.3724	106597.8982	99.94%	106580.1297	106597.8982	99.98%
C	94987.68703	95039.34815	99.95%	95025.12226	95039.34815	99.99%
G	9814.463798	9821.676124	99.93%	9819.690071	9821.676124	99.98%
I	35006.06566	35047.78955	99.88%	35035.74568	35047.78955	99.97%
NX	-11049.0317	-11057.15127	99.93%	-11054.91539	-11057.15127	99.98%

5.10. A First Scenario of Economic Growth

The working hypothesis in the previous section relative to the dynamic equilibrium, assumed constant money supply. Hypothesis may seem forced, but we must not neglect the fact that if the money supply (M) would be variable, the system of differential equations (12) - (13) would not have had constant coefficients, its integration being particularly difficult. In what follows, however, we take into account the variability of money supply, but only studying static balance (otherwise, the dynamic limit).

In this first scenario, we propose, first, to determine how the money supply trend.

The analysis of data from the period 2006-2012 (considered because in 2005 there was an increase in the supply of currency aberrant 93.75%) reveals a rather uniform increase in the money supply, with the exception of 2007 (an increase of 40.15%). Substituting this last variation interpolated values we obtain an average increase of 8.78% in the money supply. Data analysis last four years (2009-2012) reveals that economic indicators were performed on an average of 96.15% of the potential. As a result, we determine the potential level of main indicators, and we will adjust this percentage. Also, taking into account the forecasted GDP deflator: 1.048 – 2013, 1.037 – 2014, 1.025 – 2015, the cumulative deflator is obtained since 2000: 0.202320817 – 2013, 0.195102042 – 2014, 0.190343455 – 2015. Also the forecast for CPI is 1.035 – 2013, 1.03 – 2014, 1.025 – 2015 from where the current inflation factor compared to 2000 results: 0.282781068 – 2013, 0.274544726 – 2014, 0.267848513 – 2015. Taking into account of these, we will express the results of analysis in addition to coin and current coin 2000.

Table 18. The Forecast of the Main Economic Indicators of Romania - Scenario I in 2013

Year/ Indicator	2013			
	potential (mil. lei-2000)	effective=potential· 0,9615 (mil. lei-2000)	potential (mil. lei-2013)	effective=potential· 0,9615 (mil. lei-2013)
M	20205		**99867**	
Y	126596	650775	126596	**650775**
r	0.42%		**3.93%**	
TR	1292	6641	1292	**6641**
TI	23549	121056	23549	**121056**
V	104339	536359	104339	**536359**
C	92857	477339	92857	**477339**
G	9650	49605	9650	**49605**
I	34953	179676	34953	**179676**
NX	-10864	-55845	-10864	**-55845**

Table 19. The Forecast of the Main Economic Indicators of Romania - Scenario I in 2014

Year/ Indicator	2014			
	potential (mil. lei-2000)	effective=potential· 0,9615 (mil. lei-2000)	potential (mil. lei-2014)	effective=potential· 0,9615 (mil. lei-2014)
M	21979		**108635**	
Y	134726	129539	134726	**129539**
r	-0,36%		**2,63%**	
TR	1375	1322	1375	**1322**
TI	25497	24515	25497	**24515**
V	110604	106346	110604	**106346**
C	98247	94464	98247	**94464**
G	10269	9874	10269	**9874**
I	37771	36317	37771	**36317**
NX	-11561	-11116	-11561	**-11116**

Table 20. The Forecast of the Main Economic Indicators of Romania - Scenario I in 2015

Year/ Indicator	2015			
	potential (mil. lei-2000)	effective=potential· 0,9615 (mil. lei-2000)	potential (mil. lei-2015)	effective=potential· 0,9615 (mil. lei-2015)
M	23909		**118173**	
Y	138056	132740	138056	**132740**
r	-1,20%		**1,27%**	
TR	1409	1355	1409	**1355**
TI	26590	25566	26590	**25566**
V	112874	108529	112874	**108529**
C	100065	96212	100065	**96212**
G	10523	10118	10523	**10118**
I	39315	37801	39315	**37801**
NX	-11847	-11391	-11847	**-11391**

A comparison with the "Projection of main macroeconomic indicators for the period 2013-2016" conducted by the National Commission for Prognosis, reveals a consistent correspondence, the present model being slightly more pessimistic on long term.

Thus, in Tables 18-20, the rate of GDP growth is forecast to be 1.63% - 2013 2.32% - 2014, 2.47% - 2015 while the National Commission forecast: 1, 6% - 2013, 2.2% - 2014 and 2.8% - 2015.

The individual consumption of households is projected to model the growth of 4, 59% - 2013, 1.73% - 2014 and 1.85% - 2015, while the report mentioned above states: 2.3% - 2013, 1.7% - 2014, 2.0% - 2015.

5.11. The Second Scenario of Economic Growth

In section 2, we studied changes in potential GDP and potential real interest rate relative to changes in the model constants (derived from linear regressions), resulting in a total of 13 cases of behavior depending on parameter values.

From the parameter values are obtained immediately following derived quantities are necessary for the analysis of the monotony of the above functions. We have therefore (for M=18574.32609 - money supply in 2012):

$$(81)\quad \omega = 1 + \theta_Y - ri_Y = 1 + 0.010204 - 0.328252 = 0.681952$$

$$(82)\quad \Phi_1=\frac{T_0\left(i_r md_Y+m_r\chi+c_V\omega m_r\right)-\omega Mi_r}{\omega m_r}=-30169.51536$$

$$(83)\quad \Phi_2=\frac{c_V md_Y T_0+M\chi}{md_Y}=6676.94849$$

$$(84)\quad \frac{\omega M}{md_Y}=79802.37497$$

How T_0=-18727.26768<79802.37497=$\frac{\omega M}{md_Y}$

C_0=9694.17941>Φ_2>Φ_1 follows the case of monotony 5, that is:

- Y^* and r^* are strictly increasing and strictly convex with respect to the marginal propensity to consumption (c_V), marginal net exports ν_Y, the investment rate in_Y, the marginal rate of government transfers θ_Y, the government consumption g_Y and the marginal factor influence in the investment rate (i_r);
- Y^* is strictly decreasing and strictly concave in relation to the factor that influence the demand for money in relation to interest rate (m_r) and with respect to the tax rate ri_Y;
- r^* is strictly increasing and strictly convex with respect to the factor that influence the demand for money in relation to interest rate (m_r);
- Y^* is strictly decreasing and strictly convex with respect to the rate of money demand in the economy md_Y;
- r^* is strictly decreasing and strictly concave with respect to the tax rate ri_Y and the rate of money demand in the economy md_Y.

Computing the first order partial derivatives of Y and r, we obtain the following graphs (corresponding to 1% of variation of c_V, g_Y, ν_Y, ri_Y, in_Y, θ_Y and with 10000 of i_r and m_r – the multiplicative factor in this case being taken arbitrary just for exemplifying monotony).

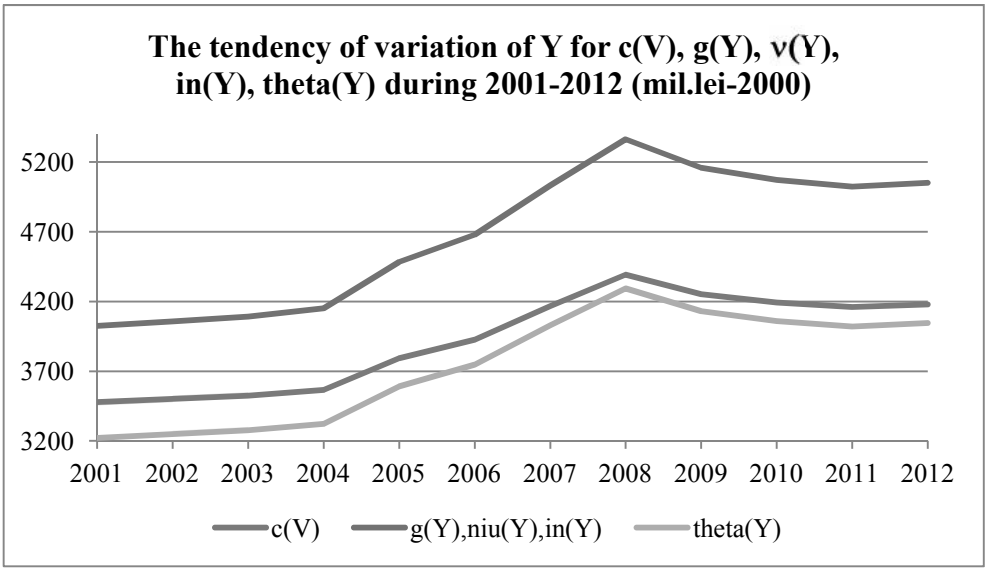

Figure 20.

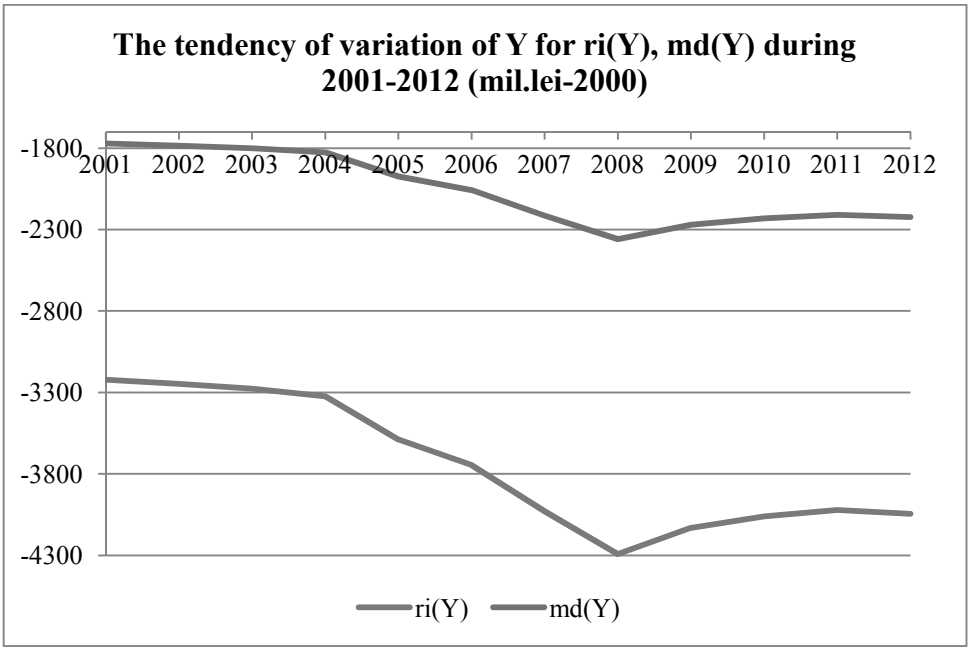

Figure 21.

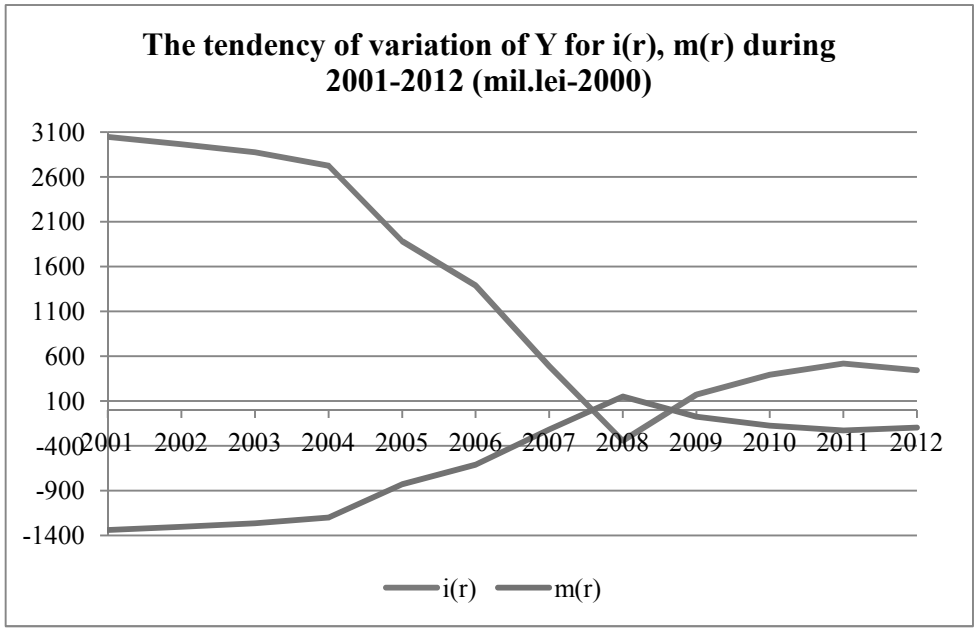

Figure 22.

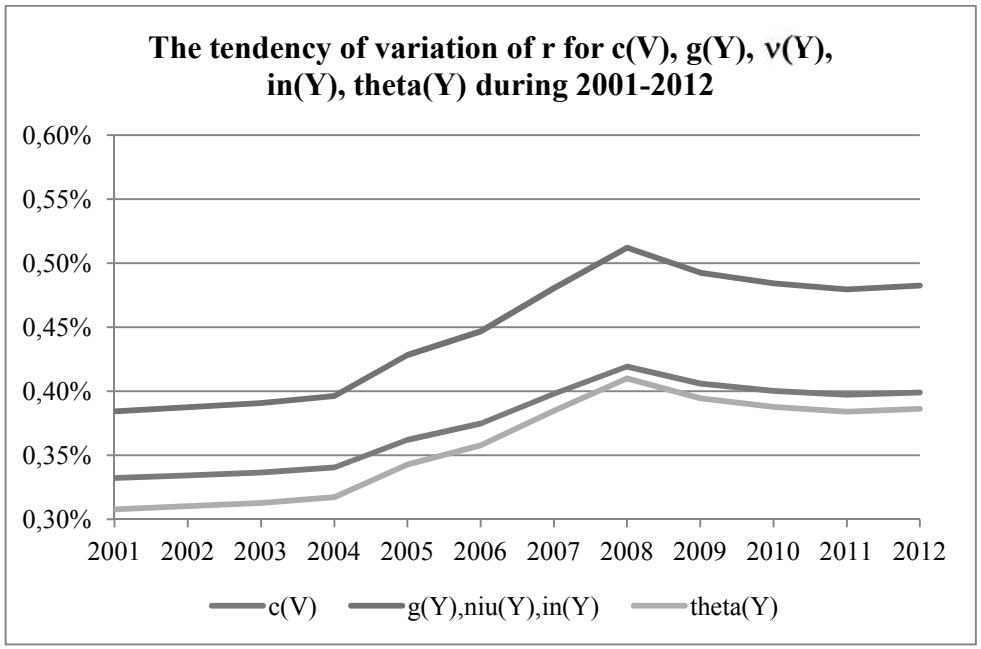

Figure 23.

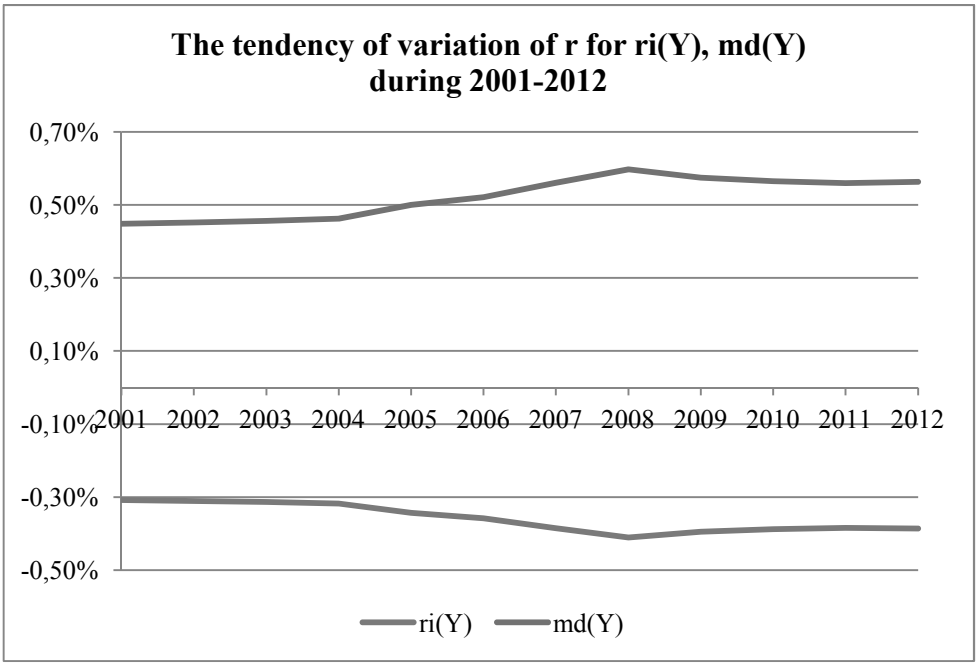

Figure 24.

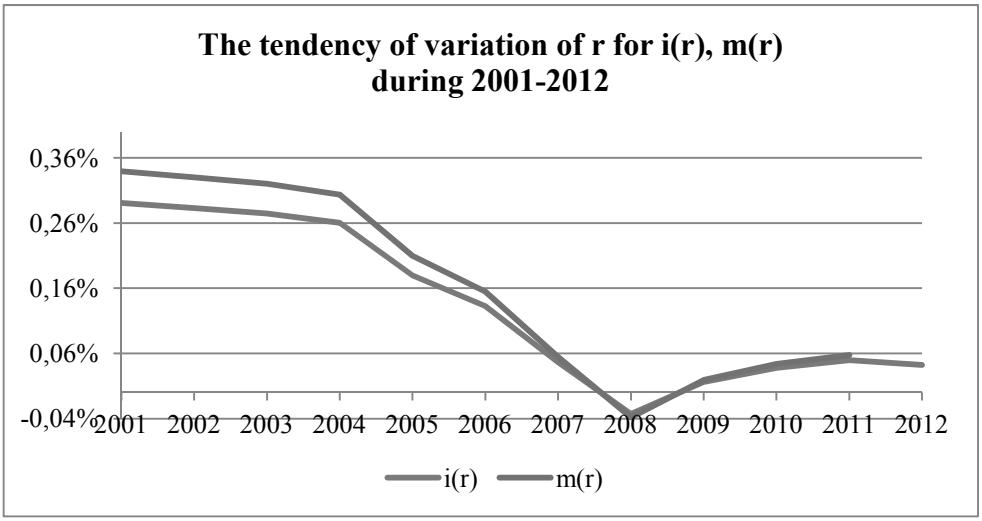

Figure 25.

From the above graphs, it is noted that, for example, an increase in the marginal propensity to consumption from 0.80 to 0.81 will result, in the conditions of constancy of all other parameters of the model, to an increase in GDP of 4180 million lei-2000. An increase in GDP by 5053 mil. lei-2000 will occur when

marginal increase in government consumption, net exports and a marginal rate of investment, where the marginal government transfers with an increase of only 4045 mil.lei-2000. Meanwhile, the increase of these parameters produces an increase in the real interest rate of 0.40% for the marginal propensity to consumption growth, of 0.48% increase in the case of marginal government consumption, net exports and the marginal rate of investment and 0.39% increase when government transfers marginal rate grow by 1%.

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Financial, Public and Regional Economics

Decision Background and Financial Institutions: for What Contemporary Theoretical Reorientation?

Walter Gerard Amedzro St-Hilaire[1]

Abstract: How financial institutions do they manage their interface with their decision-making context? What is the performance "social" beyond the simple economic and financial performance? How can we measure this performance "social"? This article focuses on the theoretical corpus contemporary necessary to understand the couple context decision / financial institutions. This is basically to contribute to the establishment of a comprehensive approach which captures applied with consistency, the conceptual opposition series (role and impact) of the decision context / financial institutions structures. Gradually, driven by the reality of change, the paper come to a Copernican revolution in the theory of relations between financial institutions and decision context. Standards for new perspectives on the role of the financial institutions, it is not the decision-making environment that revolves around the sun institutions. Note that this reversal was anticipated in 1965 by Emery and Trist in a prophetic article, but it is only recently that we began to theorize in this direction. The article finally understood that economic performance is insufficient to ensure the sustainability of the organisations, at least for him to avoid problems. We understand that in a multiple rationalities world, the issue of "social performance of the financial institutions" is wide open to uncertainty. Everything depends on the status that is given to the organization: simple machine to produce cash register for shareholders, human community service of another larger community?

Keywords: financial institutions; decision-making; performance "social"; decision context; economic performance

JEL Classification: G & L – Financial Economics – Industrial Organization

1. Introduction

As its name suggests, this article focuses on the theoretical corpus contemporary necessary to understand the couple context decision/ financial institutions. This is basically to contribute to the establishment of a comprehensive approach which captures applied with consistency, the conceptual opposition series (role and impact) of the decision context/ financial institutions structures. By necessity, we use several readings which are foreign to the ordinary management literature. Some theoretical approaches that we examine have even developed without direct reference to management science. Is that we are trying to build a problem for

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which there is still no canonical texts. It is up to us to take our well where he is. Far from being a simple juxtaposition of disparate readings, this article is in fact organized coherently. Numerous theoretical approaches addressing this problem, some are already old, but still widely used. We need to know, as they still dominate the current literature. Other currents are emerging. We also need to know them, because they are the ones who serve us most in the theoretical proposed reorganization. Of course, it is only an overview of the relevant theoretical existing inventory. We will do our nest among the currents that attract us the most, without losing sight of how they differ from the current interest us less.

The real difficulty is that contemporary decision-making context is multifaceted and allows many different readings for university like the technocrat. Each reading is a theoretical approach entirely legitimate. The challenge is therefore to reconcile realism and parsimony. The sake of realism leads to descriptions close detail, focusing on the real, its peculiarities, its variety, its inconsistencies. We want to understand the complexity in the most concrete level; we want to explain by drawing on examples. The concern of parsimony leads us instead to limit our account of reality to the smallest possible number of concepts (called principle of "Occam's razor", 1285-1347). We want to "do science" and we have articles to publish. Between these two extremes, extreme concrete and abstract extreme, the multiplicity of reality is open to all imaginable interpretations. That's why we have so many theories in this field. They all because somewhere, but they are all incomplete and somewhat unrealistic in the other. Our innovative research is to find a balance that works for us and allow us to provide the scientific community with an insight into the reality that is both new and arouses interest. How we navigate the abundance of theoretical approaches available? The recipe is to focus on two points: (1) the center of gravity of each stream studied, and (2) the potential of the current.

2. Theoretical Creativity and Hybridization

The classical currents are loaded with useful insights for our purposes, but they are less adapted to the realities of the interface financial institutions/ decision-making context. They were developed at a time when the decision context of financial institutions was easier today, at least a time when researchers considering this decision-making context a very reductionist way. Their scientific ideal was specific to the market economic approach sparingly: an object of analysis considered relatively homogeneous come natural given some explanatory variables, policy makers consistently driven by a maximizing rationality, financial institutions effectiveness considered the single variable to explain.

The decision context today is much more complex, and recognized as such. The actors are very different, they have powers deliberately neglected in economics,

and they are carriers of values that guide them to multiple rationalities, breaking with the traditional economic rationality. Effectiveness research is not their sole purpose, and even when this is the case, they define very different and incompatible ways. They refuse to consider the cost-effectiveness, ethics and legitimacy as autonomous areas of investigation. In addition, the decision context is rapidly changing. It changes not only quantitatively (eg economic growth), but also, and most importantly, qualitatively, that is to say in its own structures (eg values, forms of power, the border between public and private, between business and decision context). Previously developed theories often poorly applied to today's concerns. This is the only real trend in administrative law science. When defining the problems otherwise, must other theories to explain them. The name of realism, it is important to provide an analytical framework that integrates the first change, and secondly all the ecological and ethical economic, social, political, that make the complexity of the interface financial institutions/ decision-making context.

How to get there? Conventional theoretical approaches provide us the necessary bases. It must be supplemented by new trends. These enrich our analysis frameworks in three ways: they clarify the gray areas of the classical theories, they draw unthinkable new perspectives in the academic world of partitioned once, and finally, they share a concern for interdisciplinary that is precisely one of our own objectives. They allow us to better capture the contemporary complexities. This enrichment is often the result of hybridization between related disciplines that have long ignored.

Thus, economic sociology attempts to explain economic phenomena with the tools of sociology, while institutional economics considering social facts with the concepts of economics. Philosophy burst the old models of instrumental rationality, which drags itself to new problems. Individualistic social psychology comes to the aid of holistic sociology, which in turn gives a contextual framework. The old dichotomy between structures and processes is resolved in the constructivist approach, whose roots into theology. The other old dichotomy between agency and context is a compromise in the theory of the structure. As to the theory of organizations, it is enriched by the contributions of political science and ethics approach by stakeholders (stakeholders), which opens the field to these disciplines often totally new for them now. Management is the notion of “social responsibility of business” which calls into question many ideas in management manuals. Last vying, the rising ideology of sustainable development and structural changes that cause its practice, invite to rethink the analysis received from the past for the sake of integration frameworks. This hybridization is therefore not due to chance. It arises from a real need to understand that our time.

3. The Joint Study

The study is organized in a logical manner. We begin to justify why we need a new epistemology to address this problem financial institutions/ decision-making context. Then, we try to understand the various approaches to the scientific object "decision context". We focus subsequently on the analysis of financial institutions torque/ decision-making context. The process is gradual. There are first presented any two classical approaches still in force. Are then introduced, several approaches emerging, which we consider particularly productive for our purposes. Thus, after testing our understanding of both applications, we are finalizing the article with a theoretical reconfiguration of financial institutions torque/ decision-making context.

First examine how a new epistemology emerges to study our problem, that multiple rationalities. The traditional financial institutions theories are usually based on a concept of rationality similar to that used by economics (think of the old "scientific organization of labor" Taylor and his descendants). This so-called "instrumental" rationality explains behavior by maximizing an "objective function" (that is to say a measurable satisfaction), or by minimizing costs to avoid (which analytically is the same). As stakeholders were considered as mere economic actors, incarnations of homo economicus among others (sellers or buyers maximizers), the model of instrumental rationality was adequate for the theory. For our purposes, however, this model has serious limitations. Maximizing the calculation does not in itself explain everything in behavior, except to extend the definition beyond the recognizable.

To picture how many Democrats among you would be willing to barter parliamentary democracy against tax cuts an effective dictatorship? Why do so many people they donate to Greenpeace or WWF to preserve species? One could certainly bring these species in an objective function of satisfaction, because they somehow "belong to us", or at least, they are neighbors. They enrich our quality of life, and by saving, perhaps every donor that he selfishly maximizes their individual welfare. This is what pretends a utilitarian economist said. How then to explain the gifts received from abroad to save these species, or the gesture of the people who send their money to preserve a species in a neighboring country that has virtually no "utility"? Why are appalled us the deplorable working conditions of children working in some Asian factories as they help keep the cost of the products they produce lower for us? Maybe some of us will rush to the local mall to enjoy it, but others hesitate, and some pure militate actively stop this exploitation. We are rational, irrational, or multi-rational?

Today, to be realistic, we must therefore consider the stakeholders in all decision-making context of their behavior, some of which do not respond readily to the classical rationality of maximizing a stable objective function. Many researchers

have thus concluded that in many cases, the behavior of actors is explained less by exclusive reference to a calculation by maximizing the "good reasons" that gave these actors. The choice of actors could just as well be based on calculations (rationality called "instrumental") on "values" (rationality called "axiological"), habits, or rules of behavior regarded as legitimate, and often in spite their cost. The most common in scientific paradigms in management standard economic rationality will be our starting point. It will be criticized by the so-called "postmodern", "institutionalist" and contemporary "critical" approaches. The aim is to show that there are different ways of conceiving of rationality, and therefore theories that rely solely on the maximisatrice rationality are at best incomplete, and sometimes inaccurate, for our purposes. This postulate multiple rationalities however not unanimous and we see throughout the effects of this controversy on the available theoretical positions.

Then, we try to identify the object "decision context", one of the two elements of the financial institutions torque/ decision-making context that is the subject of this study. We chose three perspectives that seem useful for conceptualizing the interface we financial institutions/ decision-making context. For each, we offer a metaphor that sums up the meaning (the famous sake of parsimony). In the first perspective we see how economics treats the subject. Its center of gravity is efficiency. Logically, it addresses the decision context as a market, but as an imperfect market. We start from the neoclassical approach "Welfare Economics" (Economic welfare). Favorable market, it nevertheless considers that it is "imperfect" and suffers from "failures" (market failures) that cannot be corrected naturally. It justifies this by using the sociopolitical intrusion in the market, in the form of state intervention in charge to correct these failures. It is in these texts that we could approach the reasoning of classical economic type, which still occupies a central place in the study of economic decisions, whether public or private policy strategy. For many authors, the classic economic model, revised or not by the Welfare Economics, is unsurpassable. For others, it is the paradigm down. Among economists, both called "institutionalist" schools try to exceed approach Welfare Economics. Each recognizes its contribution to a better understanding of socio-political elements in the economy. However, both accuse her normative, prescribing roles for the state regardless of the reality in the Welfare Economics, when the market is malfunctioning, the state should simply be to avoid overflow because there no other recourse. Institutionalist approaches purport to offer a more sophisticated explanation of the socio-political presence in the economy. They are also more ambitious, as they extend their analysis to all institutions, not just the state. They are part of the same name ("institutionalist") as they seek both to explain the presence of economic institutions (rather than simple exchanges) in the decision-making context. Yet they are at loggerheads because they offer radically different explanations.

For reasons that we will see, we address these currents in the reverse order of their appearance. The first stream is the most recent. It is called "neo-institutionalist" (to differentiate it from the other, which is earlier, and he adopts the intuitions but rejects methods and political connotations). He comes from a triple parentage: the political philosophy of liberalism, classical microeconomics and "scientific method" (mathematically testable hypotheses). This trend dates back to the sixties. This explains the presence of socio-economic institutions by the fact that these institutions collectively offer cheaper alternatives to perform certain tasks that the multiplication of inter individual exchanges. It forms the basis of what some call the "neo-liberalism".

The second stream is the oldest. It dates back to the late 19th century. Once called simply "institutional economics", it now refers to the institutionalism "orthodox" or Old Institutionalism, to differentiate it from its neo-classical offspring. Policy more "social-democratic" (in contemporary terms) sensitivity, it is on him that was founded the New Deal in the United States in the 1930s. This current has long posed a competitor of neoclassical economics, which he blames his reductionism, because starting from the erroneous assumption that economic "social facts", the institutions in particular, would be the simple result aggregation of individual economic calculations. He takes it for granted that the socio-economic reality is somewhat more complex. Eclectic, it borrows many social sciences, particularly sociology, political science and social psychology. His concern for realism led him to develop quite complex descriptive models, and reject the canonical scientific method, and in particular the mathematical modeling. The controversy between the two economic trends called "institutionalist" is often acrimonious. Each accuses the other of scientific quackery.

At this point of the article, we can already make a first observation. We sought to conceptualize the "decision context" object, limiting ourselves to a single discipline, economic science, a science that is more "scientific" than others. We would have thought to find some certainty. This is not the case. The field is across multiple controversies, where each object defines its own way, and in fact it follows an analysis that has deep differences with those of its competitors. If economists merely bring partial lighting (if partial) of our object, perhaps we find more serene truths in other disciplines? Do not dream, because of course it is not, and it will only get worse as and as we move forward in our theoretical journey. Take it otherwise, for example by adopting a more positive formulation: "Of course, there is nothing, and that's what makes this exciting product." The second perspective that we have chosen is that of political science. Its center of gravity is power. It designs the decision context as a field of places of power. We will consider first the exercise of power as a game where the socio-political actors with very different interests pursuing their interests through specialized structures (the socio-political process). We then focus on the drivers of these game players,

pressure groups, examining how they exercise their power. Rethink these theories when it comes time to study the stakeholders of the company (stakeholders). The third perspective is that of sociology said institutionalist. Logically, it defines the decision context as a network of institutions, that is to say, collective rules. There are other sociological approaches such as interactionist sociology, constructivist, structuralism, phenomenological, and many others who are fighting the truth. In sociology, the controversy may be more numerous, more abrasive, and more durable than elsewhere. We chose the institutionalist sociology because at this point in our study we believe it is the best alternative to oppose the two perspectives that we have seen.

We distinguish here three approaches, which are relatively well together because they complement each other. The first approach is that of economic sociology, which aims to explain the economic facts by the concepts of sociology. Warning, do not confuse with the approach of institutional economics that it applies to explain social facts by the concepts of the economy. The difference is not insignificant. These are two very different epistemologies that clash, that is to say, both theoretical and empirical own devices, sometimes difficult to reconcile, even incompatible. Economic sociology is rooted in sociology. Institutional economics is rooted in economics. One can hardly imagine a professor specializing in one can be engaged in the department of teacher specialized in the other that says it all. The second institutionalist approach does not particularly care about the economy. It clearly portrays the heart of sociology "sociologizing." Give him to simplify the name institutionalist approach, calling it perhaps "functionalist", to differentiate it from the other two. It was under this name that we find in the management literature. This approach considers that any human collective, market organization (public, private, non-profit advocacy group, network) is in any way an institution, or has a very high proportion of so-called institutional characteristics, and should be approached as tel. To explain the context, it is only specific concepts in sociology. It is even ready to give an explanation of the economic institutions to economic sociologists, if it makes them happy. It is this approach that is closest to the theory of the financial institutions. Some of its most prominent representatives are working elsewhere in the administration faculties (Department of Management). The third sociological approach attempts to explain the institutional contexts through a combination of sociological concepts borrowed from political science (power) concepts rather than the economy (efficiency). It is an integral part of current sociology, and would be considered marginal in the political science department. Give him the epithet here sociopolitical.

These three approaches are in fact largely complementary. Each share the same conceptual basis, fortified or not, sociology, and explores different aspects of the reality of institutions. A nice theoretical breakthrough here would achieve seamlessly integrate the contributions of these three trends in one. Our area would

be the first to benefit. Notice that the first and third approaches are attempts hybridization, and no attempts to interdisciplinarity. They are made by sociologists that enrich their conceptual borrowing by some external directory disciplines but remain sociologists. These sociologists interdisciplinarity does not come, they do not seek to develop a common vocabulary between their discipline and those they are borrowing. In contrast, the second approach is Aboriginal. It builds on a long tradition in sociology, functionalism, and a once glorious but somewhat fallen out of favor since the 1970s, and the contemporary institutionalists have successfully revived by modernizing epistemology. Small focus: this brief overview shows that the term "institutionalist" is used in very different contexts, and the authors often do not address speech. There is no "institutionalist school" as such. There is only one discipline to another, a common interest in the explanation of the formation and functioning of institutions (that is to say collectively shared rules that allow the coordination of a decision context) rather for closer study objects such as productivity or divorce rates. Here the similarities end. Everything else is scientific controversy. Added to this is the fact that the term "institutional" is also commonly used to designate blurred realities of sub-societal level (institutional is what is established by the State or imposed by the management of the university, or which enjoyed a lasting notoriety).

Let's take a break and practice illustrates the concepts discussed so far by applying them to two phenomena. Both are crucial to the positioning of the financial institutions against their decision context. The first example concerns public regulation (all laws and regulations that apply to businesses). Even if the subject is conventionally considered as belonging to the economy, we see that regulation is a hybrid object. It is both economical (it seeks to influence the maximizing behavior of firms), political (it is imposed by the state and has its source in the law), and social (this is an institution that is based on rules and values of living together). Three explanatory approaches are proposed. The first (public interest) is based on the welfare economics, the second (private interests) on the new institutional economics, and the third (control systems) on the so-called orthodox institutional economics. Nothing new in these approaches. We are thus faced with three hardly compatible approaches to explain the same phenomenon: we are immersed in the socio-political. The first is the most logical, considering the fundamental assumptions of neoclassical economics. The second is the more cynical, and his posture is clearly anti-state (although some authors deny it). The third is more pragmatic, and its position is pro-state. We are therefore not in sub-particle physics is hard to imagine that the scientific results of physicists depend on their political beliefs ("the theory of relativity is it left or right?"). Yet this is the case in the social science of economics.

The second illustration concerns the concept of issues. A challenge for us will be a societal problem of increasing intensity requiring the attention of financial

institutions. As it grows, then stabilizing, an issue often acquires the status of an institution (a problem arises a social pressure to settle, the state finally passed a law). To study this phenomenon apparently typical social, we will focus this time sociological approaches. However, we quickly discover that here too, appearances are deceiving. One issue involves players, so power struggles (political) around the allocation of resources (economic). Our goal is to understand how issues are constructed. To do this, logically enough, we use the so-called epistemology puzzle from our point of view (some say "constructivist", but we leave this term PDC psychology, to avoid confusion). It is somewhat new compared to some of the approaches we have studied so far, because it makes a great place for players. It allows us to address realistically the issues faced by financial institutions. This approach is "actionist", that is to say, based on the interaction between the work of actors and their performances. It assumes that reality is before "socially constructed." Whatever has been defined as such. What is problematic has also been defined as such. What is problematic has also been defined as such. This approach will teach us and a decision is not a problem as long as it has not been revealed and supported by stakeholders with sufficient social and media power to impose their view of social reality. We find this approach later when we discuss the topic of creative innovative organization's decision-making context. Nothing prevents the innovative organization indeed behave like any social actor to influence the construction of the issues that challenge based on its own interests, either alone or with others.

Three suggestions are emerging here. First, let's make sure we understand why this approach is particularly useful for studying complex processes where heterogeneous actors pursue conflicting interests. Retain it on our list of epistemologies that we might need. Secondly, let us also that we understand how this approach is radically opposed to epistemology institutionalist. Finally, make the difference between this approach and other approaches based on the players that we have seen so far. After reflecting on the various geometries with which we can realize the object "decision context", we now turn directly available theories to analyze the interface financial institutions/ decision-making context. These parties are two sides of the same coin. For pedagogical reasons, consider them initially as temporarily inconsistent. Attach us to understand what makes them different. One seeks to overcome this dichotomy by using theories emerging, often little-known management, but that seem specific to bypass certain limitations of the classical theories.

With each other, we enter fully into the subject of the financial institutions/ decision-making context. This section is devoted to theories that posit that the gap between innovative organization and decision-making context, the decision-making environment dominates. Two quite different approaches to share this perspective. Both start from the point of view - long held as common sense - that the innovative

organization is ultimately dominated by his decision context, that is to say, if it does not fit the requirements of this decision context, at least in the long term, it will disappear. We recognize here the old premise of microeconomics. Where the two approaches differ is in the nature of the adaptation.

The first approach considers the innovative organization is primarily dependent on external technical and economic factors. Within this approach, several points of view are possible. For some authors, it is the requirements of market structures that dominate (competitive markets, for example), for others, critical resources that innovative organization must obtain to survive (resource dependence), while others Again, the existence of a "niche" for the innovative organization to reproduce (demography financial institutions [Population Ecology]). These currents are distinguished by their level of analysis (individual vs. population). They also differ in their degree of determinism: temperate in the case of resource dependence (face their external dependence, the leaders have some leeway), very strong in the Demography of financial institutions (disappears when the niche, innovative organization and his ilk in the same niche disappear in turn, regardless of the management team in place).

The second approach places the dependence of the most innovative organization in socio-cultural as technical and economic factors. This is the institutional approach - once again - but this time financial institutions theory, rather than sociology itself. She professes that all financial institutions depend at least in part on external sociopolitical support and should be given enough attention to continue without problems. For most of today's financial institutions, the preservation of financial institutions legitimacy and that of ethical integrity is particularly important, sometimes more than the market (see the case of Nike or Arthur Andersen, the first fight since 15 years to restore its legitimacy skinned, the second disappeared a few weeks after a scandal). In this case professional bodies (accountants, doctors, etc.), The law grants a monopoly economic actors who meet certain conditions of legitimacy. For some financial institutions, the external socio-political support is even a condition of survival, regardless of their economic efficiency. This is the case of many financial institutions, or "permanently fail", which is known for example that they can survive for years through grants. Again, we have to make shades on the degree of determinism of financial institutions/ decision context relationship. The role of agents (decision makers) in relation to external forces in explaining financial institutions decisions had been very controversial debates. Do we understand! The two approaches basically say the same thing, but they do not say the same. Depending on whether we use one or the other, we will not follow the same plan of research, we do not collect the same data, we do not interrogate the same people, and we will not get the same results.

Continue our analysis of the financial institutions interface / decision-making context, but change course. The innovative organization is no longer seen as

dominated by its decision context. Rather, it is designed as dominant, or at least as much involved in the formation of the decision context we can say that it is a creative (some say "co-creator"). The fifth part is a key turning point in the research. It is from this that we start to draft the "re-theorizing" announced for the last part.

There is a rich literature on this subject, both in industrial economics in management (competitive strategy). This literature is still too focused on the relationship between state/ market financial institutions for our purposes. It is among sociologists that we will definitely take what we need, even if their work often owe nothing to the analysis of the innovative organization and its decision-making context. Incidentally, this is the genius of management science. They are more ecumenical than doctrinaire. They always welcomed without qualms inputs from external disciplines, even those who struggle to recognize the legitimacy of management as "science" university, as soon as these contributions they seemed fruitful. Some theoretical approaches presented here timidly appeared at the doors of research management (encouraging the organization theory ends gradually escape from the psychic influence of microeconomics sign).

We consider two major issues. The first is that the networks. Why? Because both the theory and practice of business consider more innovative organization that must be understood as a member of networks that are both constraints and opportunities for her. Consider innovative organization as a node in a network, among other nodes, is not trivial. It is moving the projector from the individual organization, facing a competitive decision-making context, even hostile, to the interagency. In this transfer, innovative organization loses its central position. It takes place among other members, whose interests are the same legitimate shot. The innovative organization is not only designed as a war machine, as is the case in economics or management strategy. It is also seen as an actor involved in the life of his decision-making context, which are rooted in alliances, which must manage both conflict and cooperation. That's what we need to understand the multiple modes of interaction that develops innovative organization with its socio-political decision-making context.

This problem allows us to break deadlocks model alone against all heroic financial institutions, who fights for the sake of its own shareholders. It allows us to lead a more oriented stakeholder analysis, and to bridge the gap between traditional theory and new approaches to the stakeholders. It opens directly on new issues such as the inclusion of multiple rationalities, the integration of economic, social and political elements within the same social analysis, and of course business ethics, which is an important part the financial institutions relationship/ decision-making context. This problem is an obvious instrumental utility to conduct more realistic and in line with the research theories today. It will not escape you; however, it also implies a political position, that of a democratic egalitarianism in

the status accorded to different socio-economic actors (all stakeholders have rights, not just shareholders).

Within the issue of networks, we examine three approaches that focus on different aspects. The first approach is the oldest. It is static, and considers only the networks in their structural aspects, that is to say formal. It comes from the traditional structural-functionalist sociology. This approach leaves little room for actors. It is therefore not suitable for dynamic re-theorizing that makes the lion's share of decision makers, their representations and processes in which they are incurred. However, it provides us with key concepts to describe the reality of the networks. It also allows us to contrast well to the originality of the two following approaches.

The second approach is a great place for players. It comes from economic sociology. It considers that economic actions are strongly embedded ("embedded") in personal relationships based not only on economic interests, but also institutionalized behavior (particularly related to the culture of the players). Within these tissues relations, non-economic factors can significantly influence the expected behavior in economic theory, and sometimes even be dominant. This approach is defined as an intermediate position with respect to two major existing theoretical axes, which tend to despise the actor. On the one hand, traditional economic theories make the actor a "rational fool" (Amartya Sen, Nobel Prize in Economics in 1998) who lives in solitude with no other relationship than he is bound by contract profitable. On the other hand, sociological structural-functionalist theories of inspiration, which is still the most used in management, make the actor a puppet orchestrated by stronger than her social processes. Between the two, we suggest the approach of embedding, are real human beings. In a study which recognizes the existence of multiple rationalities, understand that this approach cannot leave us indifferent. Halfway between the previous approach and the next, this approach remains largely structural (there studies established networks).

The third network-based approach is that of sharing (Enrollment). It has other names, among which his own reluctant writers (especially "sociology of translation", "theory of the actor-network" or "sociology of associations"). It is still very exotic management, since it is derived from a cross between ethnomethodology (an anthropological sub-branch of the sociology of the actor) and the sociology of science (socio-technical systems). Its merit is twofold. On the one hand, it brings the concept of network dynamics it lacks in previous approaches. Prior to exist, a network must be built, and it particularly enterprising players must enlist multiple partners. On the other hand, this approach achieves some interdisciplinarity, which is a tour de force in contemporary sociology. We ourselves need this interdisciplinary (not to be confused with multidisciplinarity, which is the juxtaposition of expertise without integrating them into a common

vocabulary) because we want to treat all the factors considered in isolation from other disciplines. In this approach, we see actors build the networks they establish. Their autonomy is initially greater than in the other approaches. As and when they reach their goal, their networks stabilize around them, and begin to limit their autonomy. This proactive approach is well suited to management science, especially to those who see management as a permanent form of project management. Note that unlike its competitors, the "actor-network" approach does not differentiate between human actors (you, me, all bipeds) and non-human actors (machines, texts, St. Jacques shells), provided they have an effect on other parts of the network to which they belong. We will see why this original design allows us to address some of the thorniest problems in the couple financial institutions/ decision-making context, especially in the context of the challenges of sustainable development.

After we looked at the epistemology of networks, we try to go further in the autonomy of the actor. A second problem will be introduced. We are now talking of "negotiated decision-making context," since we consider that any decision-making context is actually the result of negotiations between actors. You should hear this term in a broad sense, similar to that of deliberate interaction. Four approaches are discussed. They are complementary, but all start from a slightly different perspective, and each leads to different issues and methodologies. When you choose one, it closes the benefits of others, even if they all share the same desire to explain the decision-making system in force (the structures in which we operate) by the continuous involvement of stakeholders. Again, there are many other approaches to the constitution of the order, but those proposed seem particularly useful for our purposes. Many of them are new in management. It is up to tame, because none has been developed with the aim to better understand the multi interface/ decision-making context.

The first approach is that of the negotiated order. It comes from the great tradition of interactionist sociology called Chicago. Why is there a social order, that is to say it stable arrangements between actors? Because these actors have negotiated the content of their relations. Why did they negotiate? Precisely because they need predictability in the relationship, especially in changing contexts. How long does this order? As long as the players continue. A strength of this approach is that it helps to explain either, with the same concepts, conflict and collaboration. We see the direct application we can do to study the order established between financial institutions and its partners. The second approach is new management. This is the theory of Economy of variables (also called Economies of scale). It comes from Paris, where she held for ten years a large body of research on the borderline between economics, financial institutions sociology and philosophy. She said part of the current conventions of Economics, an original attempt which aims to discover what are the "conventions" (rules) that allow the coordination of interests

between individuals in a world characterized by high uncertainty (and where such coordination cannot be done by explicit contracts). A rule of conventional type (or agreement) is opposed to the rules of contractual (eg explicit contracts) and rules binding model (e.g. laws), in that it is vague, of obscure origin, arbitrary and without legal sanction. It is, however, allowing cooperation where we did not expect. This approach also seeks to reconcile individual levels and institutional levels of analysis traditionally incompatible.

We leave aside the least useful for us part of the economy of conventions, which are primarily interested in economic coordination. For the purposes of the course, we will focus on contributions of Economy of grandeur, which is closer to the players and the organization, so our epistemology. We will focus on how it manages to identify what are the logical that actors use when they need to reconcile irreconcilable interests a priori. The authors identified six logic, which they call "cities" or "worlds", which are actually systems of justification themselves based on value systems most commonly invoked by the actors. This approach provides us with a useful operationalization of the concept of multiple rationalities. It also allows to significantly enriching the previous approach of negotiated order. In its relations with its partners, internal and external, the innovative organization is at the heart of this problem.

The third approach involves the concrete action systems Crozier and Friedberg. It dates back to the 1970s, and is still very much alive. It was developed from case studies are limited to internal aspects of large bureaucratic firms (although Crozier could sometimes extend to the social phenomena), but it is rich in insights for our purposes. It offers an analysis of collective action similar to the previous, but with an emphasis on power relations between players. This is where it is useful to us because it goes further in this direction than the other approaches discussed this week. Taking into account this dimension is essential for us, since we consider that any relationship between the innovative organization and its stakeholders is a power relationship. Strap yourself in particular the concept of "concrete action system." The latter approach is a bit abstruse, but it is very fashionable. It also comes from European sociology, specifically the United Kingdom. This is the approach of structuring Giddens. What interests us here is that it proposes the renewal of the relationship between the actor and the structure in which it takes place. Giddens attempts to reconcile the irreconcilable, and he succeeded. It starts from the premise that the sociological tradition provides two conflicting perspectives on these relationships. Some authors indeed structure constraint which requires the actor, while other authors are a product of human action. Giddens draws from all traditions that preceded it, and proposes to treat the structures both as a policy and as a product of the action. The "structure" is the process by which these structures are produced and reproduced. The approach also pays great attention to unexpected side effects, and often perverse decisions, a feature peculiar

to complex systems of action that we want to study. Giddens is not easy to understand, but his insights provide a better anchor the previous approaches, which are sometimes too tend to drift to an overstatement of cognitive or voluntarism, neglecting the contextual aspects of the action. We who are interested in the organization know that no strategy unfolds in a vacuum, and a good explanation of the financial institutions interface/ decision cannot ignore the context in which this structural interface is rooted.

4. Analyzing and Synthesizing

This journey through different epistemologies has allowed us to expand our theoretical repertoire. We can now refocus on innovative organization as level of analysis. This is more an exhortation than a finished product. By "theoretical restructuring" must include a new approach to understanding the financial institutions/ decision-making context, beyond the traditional model of economic rationality. By "puzzlisante" should be understood as based on the stakeholder approach, those who build the relationship in which the company is engaged. These players will receive the name of "stakeholders" are the stakeholders of modern management literature. We use specialized management literature as a base. Four themes are:

– The first theme wants to show that interest in financial institutions / decision context relations leads us to restructure traditional notions of decision-making context, the innovative organization and boundaries of the financial institutions. We felt for some time it would take to go through this challenge. Specializing in the management literature now opens several concrete ways to achieve this.

– First, it should be considered not only the innovative organization as an open system in its decision-making context, but also as "outgoing" organization, that is to say, in constant dialogue with the decision-making context. Apply this insight at the innovative organization.

We start from a premise that should now be familiar. The decision context cannot be considered as an external data with which innovative organization must, willy-nilly, compose. Instead, it must be conceived as a social construct, that is to say, as the result of ongoing interactions between different members of the decision-field to which it belongs. The innovative organization is not neutral in the decision-making context. She is the co-creator. We can take the reasoning to argue that its prosperity depends largely on the type of decision-making environment that was able to choose or (co-) create. Note that the innovative organization here is neither dominant nor dominated by the decision context. It is interactive. It is of course limited by the institutional and political context in which it operates (dominated). It must be accepted (dominated) in the networks it has itself helped to build

(dominant, co-creator). The decision-making context of the firm is here conceived as a set of networks in which it is itself a stakeholder. But that's not all. The decision context is an entity under construction, deconstruction and reconstruction permanent. Structure that was theoretically in the past, the decision-making context is process. This is a complete reversal of perspective: given the decision context is built. This epistemological change cannot be done in isolation. It requires adjusting the epistemological status of the innovative organization to make coherent analysis between the two entities. All research involving innovative organization is necessarily based on an underlying theory that the researcher is aware or not. It must ensure that the theory on which it intends to base its analysis is consistent with the conceptualization of the decision context. Among the available theories, some are better suited than others to this analysis from the perspective of social construction. There are others and we choose: several combinations are possible, but must above all be consistent.

The border issue between financial institutions/ decision context, i.e. the location of the interface between the two, now also becomes problematic. Historically, this issue has undergone several transformations. Organization theory in the early 20th century, which was dedicated solely to the research principles of internal operational efficiency, has long ignored. Then came the systemic approach, which opened the innovative organization's decision-making context, and therefore had to worry about the border between the two. However, the response was treated as evidence: was rejected in the decision context all relevant factors in the decision but outside the total control of the innovative organization. Today, innovative organization “extrovert” is so open about his decision context it is to include within its own walls some elements that were once considered part of the decision-making context. The question of the boundary between the two is therefore now problem. This new problem however is quite exciting in theory, researchers failed to notice the subject. It also raises a methodological challenge. On the ground, we will decide which is part of our system and which should be ignored. The number and quality of interviews depend on the theoretical model that we would have chosen.

Finally, a new track is open to us, that the organization has the innovative “citizen.” It is not only asked to be innovative efficient organization, we also want it assumes national social and ethical responsibilities of a local nature, and increasingly international. Globalization calls again into question the status of the innovative organization and its borders.

5. Conclusion and Recommendations

Gradually, driven by the reality of change, we thus come to a Copernican revolution in the theory of relations between financial institutions and decision context. Standards for new perspectives on the role of the financial institutions, it is

not the decision-making environment that revolves around the sun financial institutions is the innovative organization that blends in a decision-making context in which it became one of constituents. Note that this reversal was anticipated in 1965 by Emery and Trist in a prophetic article, but it is only recently that we began to theorize in this direction. Go to the second theme, the theory of "interested" or "stakeholders" (stakeholder theory). Some would argue, probably rightly, that this is not a theory but a perspective, a bit like the "systems theory", which has so excited researchers in the 60s. To be convinced, just look at the contortions that the authors take to the word "Theory" does not appear next to "Stakeholder" in the title of their publications (Stakeholder "Thinking", "Engagement", "Perspective"," Approach ", etc.). This is good news for doctoral students: there is a developing field that awaits their contributions.

For us, a stakeholder is an actor, but it is a rather special player because he has a moral sense. It is both homo economicus (you must make a good crust), homo socialis (we all friends), political man (sometimes you have to elbow) and homo moralis (we do not live by bread). One of the ambitions of the theories in terms of stakeholders is to give a theoretical status in this homo with many faces, while the traditional disciplines have never considered that one of its dimensions at once. This is an urgent work remains to be done. All actionalist literature we have seen previously, especially on the social construction, we can help. However, it is insufficient because it generally underestimates the normative aspects of human behavior, especially the ethical elements. Two important issues arise very quickly. The first is theoretical: "What is a person? "And in particular, how does it differ from traditional sociological actor. The second is empirical: "How to identify the relevant stakeholders? ". As we would not have answered these two questions, we will not know who to interview on the spot. Better think before. However, take care: the "stakeholder theory" is a misleading thought. Simple in appearance, it poses very complex theoretical and philosophical problems as soon as one takes seriously. We soon discover that the answer to both questions is strongly related to personal political philosophy, or, if we are looking at the people who pay us.

The third theme is inextricably linked to the previous one. It is the massive reintroduction of normative theory in organizations, where the concepts of values, ethics, legitimacy had largely disappeared. As for the decision context and the financial institutions study of the socio-political interface requires us again to reconsider the epistemological status of the managerial decision. Once seen only in the technical aspects of procedure, the decision should be seen today as the operationalization of a system of values. Decide, yes, but for whom, for what? How to justify to external stakeholders, including the logic of action and philosophies of life different from that advocated by the financial institutions, a decision is legitimate? In a world that recognizes the legitimacy of views (rationality) multiple of what is good or bad, desirable or not, everything is

questionable. Any decision must be justified and court stakeholders. The spread of the ideology and practices of sustainable development accelerates importance.

These philosophical questions arise every day in the boards. They join a long tradition of Western philosophical reflection on human action (more than twenty-five centuries of questions). For us, in practice, they manifest through ethical business concepts and legitimacy even more concretely, through the financial scandals of recent years. Why these scandals are produced? What did not work? Who is to blame?: In no morals, carefree shareholders who abdicated control over those stupid supposed to work for them; the incompetent State no longer provides its fundamental role of watchdog, society collectively become too permissive makers? How to avoid these scandals?: For more government regulation, more morality among policymakers, more control by stakeholders? These questions are about "normative" rather than "descriptive": they involve the use of value systems on what to and what not to do, that is to say standards behavior. An innovative organization can survive only if it provides legitimacy (that is what always said sociological institutionalism). They had simply forgotten that the ethical standards are an essential dimension of legitimacy. Several normative models specially adapted to the management of philosophers training exist. These models are more or less compatible. Considerable work remains to be done to strengthen this area. We studied extensively the issue of standards with institutionalism differently branched. Now is the time to put them to the test to enhance the management literature. In the fourth issue, we approach the last central issue in the field of social management ("Social Issues in Management"), one of the "social business performance" ("Corporate Social Performance"). We are now equipped to address three critical issues: (1) How financial institutions do they manage their interface with their decision-making context? And (2) What is the performance "social" beyond the simple economic and financial performance? and (3) How can we measure this performance "social"? At this point, it is understood that economic performance is insufficient to ensure the sustainability of the financial institutions, at least for him to avoid problems. "The company" expects more "innovative organization". But why is she exactly? What are the responsibilities of the modern innovative organization ("social responsibility")? The innovative organization need to wait to be compelled to fulfill its social responsibilities? Where end economic responsibilities and where social responsibility begins? To what extent are they compatible? Is there a limit to what you may require financial institutions? Before whom the innovative organization is responsible for it (which stakeholders), to whom is it accountable? How can these accounts? How to measure results? How to validate? If you like the debates, these questions should we put water in the mouth. We understand that in a multiple rationalities world, the issue of "social performance of the innovative organization" is wide open to uncertainty. Everything depends on the status that is given to the innovative organization:

simple machine to produce cash register for shareholders, human community service of another larger community? Wait and see ...!

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SME's Priorities and Management Authorities Directions. A Regional Approach in Romania

Bogdan-Vasile Ileanu[1]

Abstract: Especially during periods full of financial instabilities, the problems regarding inconsistent policies or related to different directions of action are easily visible. The current study is analyzing the priorities of different Management Authorities like: Central Management Authority, Local Management Authority and SMEs Management. The analysis is made on a 508 sample of management specialized respondents from all types of management authorities. After applying the quantitative method of correspondence analysis, significant differences are shown. The second part of the study concentrates on finding some join strategies at regional level.

Keywords: SMEs; correspondence analysis; management authorities; regional comparison

JEL Classification: R11; R58; C01

1. Introduction

After 1990, Romania changed their centralized economy to other type of economy, which should be transformed until now in a market economy or something very close to that form. If we agree that SMEs represent the engine of the economy, then is normal to expect that SMEs complies with the concept of the new economy. So it is desirable to see on the SMEs and Local and Central Authorities strategies which are concentrated on:

Profit increase, decentralization, increase competition mix-marketing, a performing system of management and according to latest studies intellectual capital.

As part of business process IC influence the achievement of the business success as researchers already showed (Mertins, K., Markus W. (2008), Alwert, K. et. all (2004) and many others). So as in particular case, the SMEs strategies should contain parts or more specific direction to discover, manage and increase IC.

According to Ileanu and Isaic (2009) et Ileanu et all (2011), the performance of SMEs is influenced by some intangible factors which may be considered IC generators. Using a binary logic model, factors such as training of employees,

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experience of the manager, innovation efforts, and marketing strategies were found as significant.

The study tries also to complete the analysis regarding a theoretical connection between IC evidence shown in the mentioned research papers and the strategies of different levels of management at least in one region from Romania.

2. Data Collection and Sample Profile

The study was carried out by SAMRO, in 2009, on a sample of 508 Romanian SMEs. Method of data collection consisted in auto filling a questionnaire sent it via e-mail. The regional analysis is made on a sample of 438 companies, 70 companies from the initial sample had inconsistent answers. The respondents were mostly key-persons from company management, aged between 20 and 72 years.

The structure of respondents by group age and region is presented in the table 1.

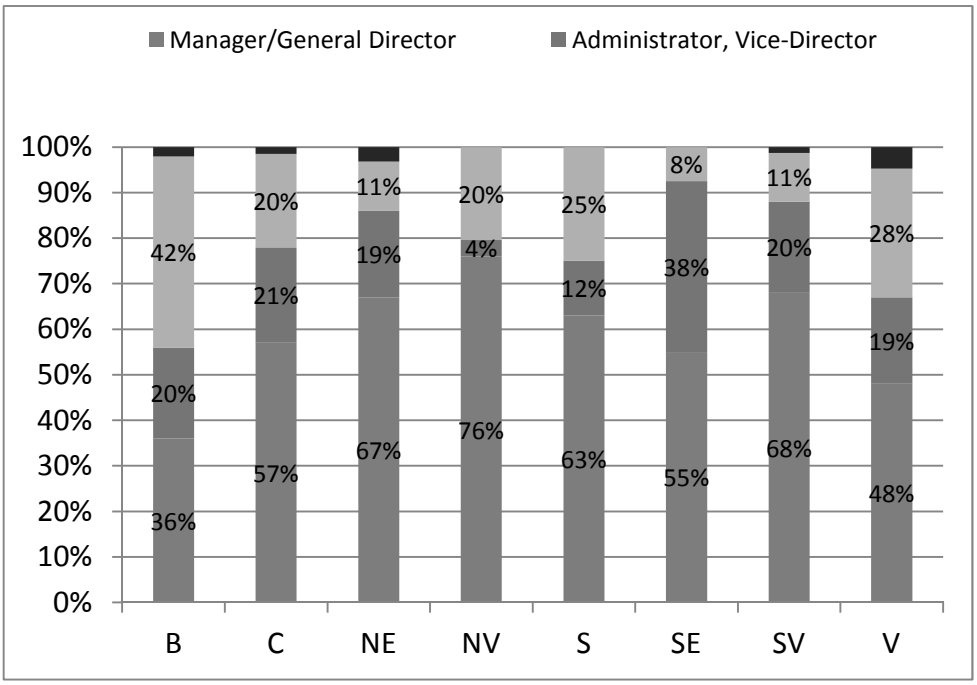
	REGION								
	B-IF	C	NE	NV	S	SE	SV	V	Total
1 20-34 y.o.	58,6%	32,3%	22,6%	25,0%	20,8%	37,5%	29,1%	23,8%	38,1%
2 35-54 y.o.	29,0%	58,5%	64,5%	64,3%	62,5%	50,0%	58,2%	61,9%	49,5%
3 Over 54 y.o.	12,4%	9,2%	12,9%	10,7%	16,7%	12,5%	12,7%	14,3%	12,3%
Total	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %

The overall structure is well balanced, most of the respondents being aged between 35-54 years old and only 12,3% of them being aged over 54 years. Splitting data by regions some remarks could be done regarding the age structure:

- in general, in most of the regions, between 50% and 65% of respondents are aged between 35 and 54 years old;
- Bucharest-Ilfov-region is an exceptions, the structure by age is concentrated in the young group (20-34 years old).

The distribution by gender is very heterogeneous between development regions. On the whole sample 62, 8% of respondents are males, but within regions the weight varies from 39, 3% in North-West and 79, 2% in South-East. More detailed information about structure by gender could be found in Table 1 from Annexes. This heterogeneity could influence regional differences on perception.

The next characteristic analyzed is position in the company of the respondents. As it can be seen from the figure 1, most of the respondents are, in each region, managers, directors, administrators.



According to this structure, the sample respondents is well equilibrated for the topic of research, in each region and, mostly experienced in the field, appropriate to give perceptive answers regarding management strategies.

3. Hypotheses

H0a. There are coherent strategies between different levels of management authorities within regions. Between regions could be some differences given to the local strategies:

H1a. Non H0

In a particular case of IC strategy

H0b. IC-strategy is a present key in all type of management authorities within and between regions

H1b. IC-strategy is a present key only in particular form of management or not present at all.

4. Methodology

I applied Multiple Correspondence Analysis in order to group nominal characteristics to each object defined by the different management authority. The analysis is made by comparison in two regions from Romania, North-East and Bucharest-Ilfov, the less developed region the most developed region from the country.

Each object should be as close as possible to a set of characteristics in order to be defined. In this way, the categories divide the objects into homogeneous subgroups. In our case if all Management Authorities are places in the same quadrant/area and are defined by almost the same characteristics then we may assume the homogeneity and coherent strategies between different levels of management. Otherwise the strategies are not coherent.

5. Results and Conclusions

In the previous study (Ileanu, 2012) I pointed that the main objective of all type of management authorities are focused on Performance achievement, Strategies and policies well founded, well planned activities, efficient control, employee training and control-evaluation of activity and performances,

According to these statistics the relation between input and output strategies made by Romanian SMES are represented as figure 2 shows it.

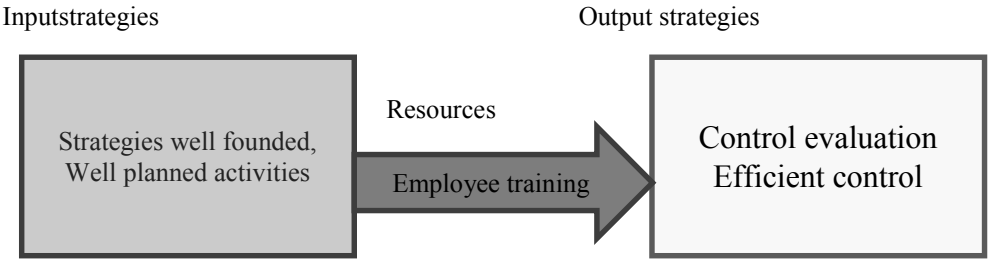
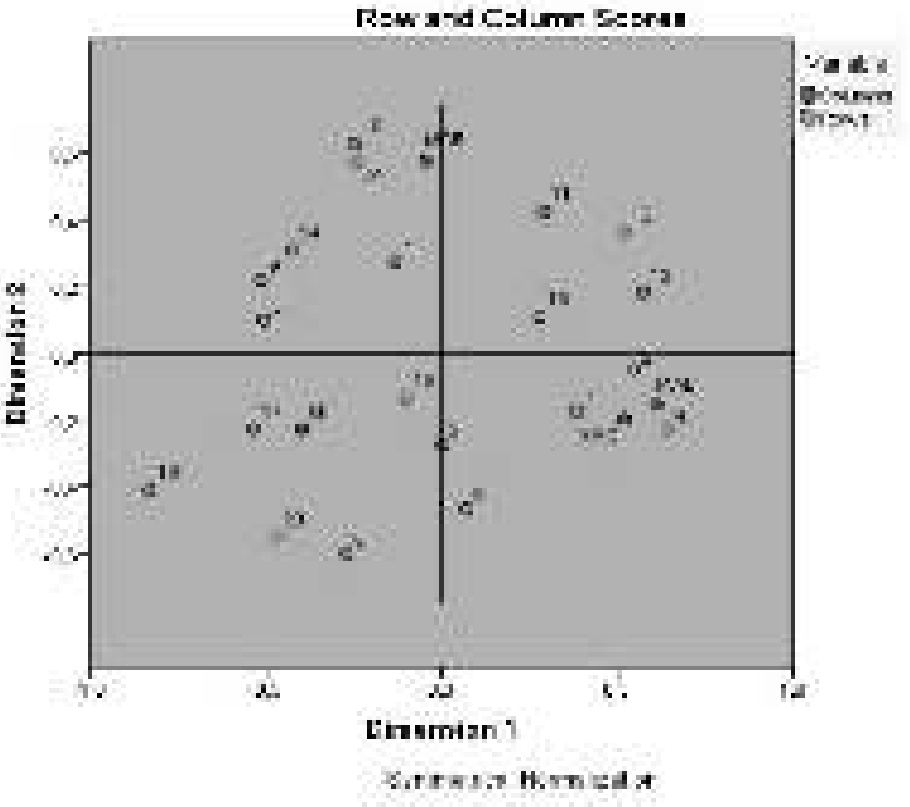


Figure 2. Management Main Actions (According to Sample Respondent's Perceptions)

A more detailed regional analysis in terms of standardized comparisons is made using Correspondence Analysis in order to test proposed hypothesis.

5.1 Bucharest –Ilfov Region



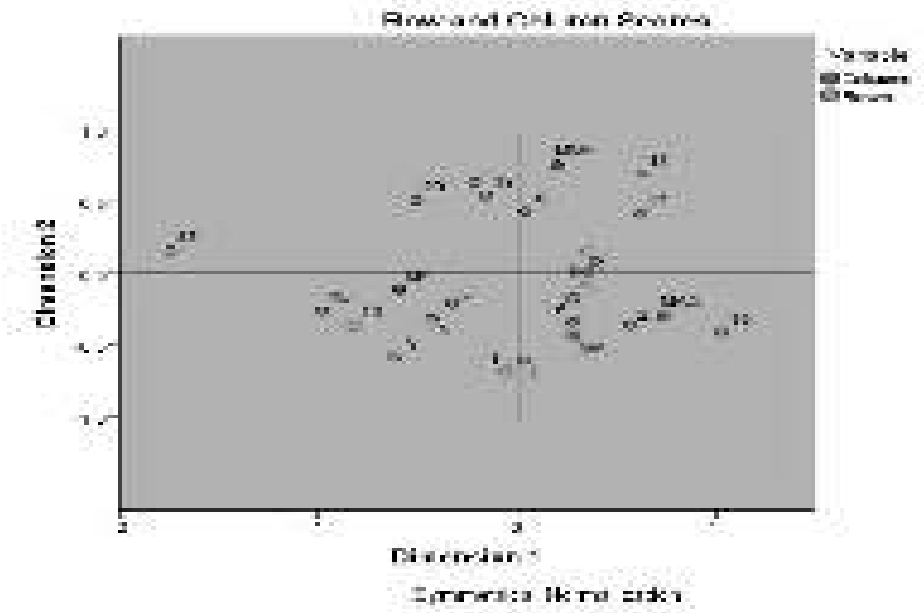
1 Performance achivement **2** Strategies and policies well founded **3** Well planed activity **4** Actions, decisions and behavior efficient control **5** Employee training **6** Control-evaluation of activity and performances **7** Projection and implementation of eficient sistem of management **8** Fast Feed-back on the socio-economic environment actions **9** Creativity and Innovation **10** Know How transfer from other countries **11** The usage of modern techniques of management **12** The valuation of informational and decisional potential **13** Implication of intern and extern stake-holders **14** Initiative and entrepreneurial spirit **15** The development of a performant informatic system **16** Training activities actions **17** Marketing actions **18** Manager behavior oriented on implication and eficiency **19** High Income and Profits achievement **20** Company sustainable development

Figure 3. Correspondence Profile of Different Management Authorities in Bucharest-Ilfov Region

Management Authorities are situated in different quadrants. In respondent perceptions, General Management (MGR) is concentrated to Know-how transfer (10) and High income profits achievements. Despite, Enterprise Management (MF)

is associated with Marketing actions, Local Management Authorities (MAL) and Central Management Authorities are seen as related to Actions, efficient control(4), Projection and implementation of efficient system of management and Strategies and policies well founded(2). Taking into account that Bucharest-Ilfov is the most developed region from Romania the characteristics associated with Local and Central authorities are convergent with the normal behavior of a high level authority of management. From statistical point of view the two latent factors which describe dimensions from the figure load 96% of information, so they can be considered as relevant. (See Table 2 from Annex)

5.2. North East Region



Statistic indicators regarding the quality of the analysis model

1 Performance achivement **2** Strategies and policies well founded **3** Well planed activity **4** Actions, decisions and behavior efficient control **5** Employee training **6** Control-evaluation of activity and performances **7** Projection and implementation of eficient sistem of management**8** Fast Feed-back on the socio-economic environment actions **9** Creativity and Innovation **10** Know How transfer from other countries**11** The usage of modern techniques of management **12** The valuation of informational and decisional potential **13** Implication of intern and extern stake-holders **14** Initiative and entrepreneurial spirit **15** The development of a performant informatic system **16** Training activities actions **17** Marketing actions **18** Manager behavior oriented on implication and eficiency **19** High Income and Profits achievement **20** Company sustainable development

Figure 4. Correspondence Profile of Different Management Authorities in North-East Region

On the North-East Region, the less developed region from Romania according to official statistics, the associations between different Management Authorities and their priorities are less visible than in Bucharest-Ilfov Region. It can be seen that Central and Local Authorities are associates with "Strategies and policies well founded as in Bucharest-Ilfov Region. However the standardized distance shows that Local Authorities are more close to "Training activities actions" on their strategies. From statistical point of view the two latent factors which describe de axes are well found since the variance explained is over 92% (Table 3 from Annexes)

The General management and Enterprise management are very far from particular strategies, so there is no particular statement which could be attached to these type of management authorities.

6. Conclusions

There are no coherent strategies between different levels of management. In both analyzed regions, the four categories of management authorities are situated in different quadrants, things which reveal the distance in collaboration or a misunderstood process.

However some closeness could be seen between Local Authorities management and Central Authorities management in both regions.

The particular strategies and their distribution are strongly correlated with the level of development of each region. In Bucharest-Ilfov region MF and MG are closer to some initiative and in North-East they are farther. From statistical point of view, the standardized heterogeneity is larger in NE region than in Bucharest-Region. A hypothesis concerning the fact that heterogeneity is indirect correlated with the level of development could be proposed.

None of the management authorities is associated with Intellectual capital components.

These results are in concordance with other findings found in the literature. Popescu, D. M et. all (2012) emphasize more weaknesses of the Romanian SMEs sector. One remark is made about "low institutional capacity of the central and local public authorities to elaborate and implement the policies".

Taking into account all these findings can be concluded that SMEs IC development is the result of the weak efforts of particular managers is not sustained by superior levels of management authorities such as MAC or MAL. In fact this situation could be created by the lack of information about strategies regarding the IC development, by the lack of resources or by a set of factors.

Bureaucracy, instability of the legal framework, delays in the payment of the invoices and slow juridical system are only few factors which will increase gap between desires and realization. The continuous inconsistency and lack of coherent policies will continue to give non-attractive environment and unsustainable development for SMEs.

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Annexes

Table 1. Structure of Respondents by Gender an Region

Gender	REG								Total
	B-IF	C	NE	NV	S	SE	SV	V	
Males	55,9%	76,9%	61,3%	39,3%	58,3%	79,2%	77,2%	47,6%	62,8%
Females	44,1%	23,1%	38,7%	60,7%	41,7%	20,8%	22,8%	52,4%	37,2%
Total	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %

Table 2. Correspondence Analysis for Bucharest-Ilfov Region-Contribution to Axes

Contribution

Dimension	Singular Value	Inertia	Proportion Explained	Cumulative Proportion
1	, 16755	, 02807	, 635	, 635
2	, 12028	, 01447	, 327	, 963
3	, 04060	, 00165	, 037	1,000
Total		, 04419	1,000	1,000

Table 3. Correspondence Analysis for North-East Region-Contribution to Axes

Dimension	Singular Value	Inertia	Proportion Explained	Cumulative Proportion
1	, 26299	, 06916	, 607	, 607
2	, 19041	, 03626	, 318	, 925
3	, 09265	, 00858	, 075	1,000
Total		, 11400	1,000	1,000

Projected Motorway Construction in the Central and North-Western Regions of Romania between 2013-2021

Istvan Csutak[1]

Abstract: Romania's highways and expressways are standing ahead of considerably high investments. The 21st Century has brought important breakthroughs in the building of highways and expressways. Our study focuses on the construction works that have been carried out in the Central and North-Western regions of Romania. The aim of this paper is presenting the two regions' motorways as compared to the national average, determination of an approximate end date for the highways that are currently under construction, as well as a comparative study of the works planned to be carried out between 2013-2021 as compared to the ones planned between the years 2004-2012. It was proven that highways in these two regions have been built using mainly state funds, thus these works are progressing slowly due to lack of consistent funding. The results of this study also relate to how fast the construction works will be finished on parts where construction has already begun, as well as whether construction works will be conducted in a higher pace than the ones between 2004 and 2012.

Keywords: A1 and A3 motorways; transport infrastructure; completion date; motorway segments; future plans

JEL Classification: O18; R42

1. Introduction

Our work depicts the situation of the transport infrastructure of the Central and North-Western regions, more precisely presenting the motorways of the two above mentioned regions, as well as presenting the situation of the expressways on a national scale. Based on the statistics of the NCMNR[2] there are four highways under construction and three proposed highway plans. The first part of the table presents the highways that are completed/ under construction/ planned and the second part includes highways proposed. Our study will only include an analysis on the first part. We must also take expressways[3] in consideration. These do not

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[2] Romanian National Company of Motorways and National Roads, March 2013.

[3] A wide road designed for high-speed travel between settlements, which may be entered and left only a certain places. On expressways the cars can travel quickly without stopping, having few or no intersections.

have such a status as highways; however, they ease the flow of the traffic, making it faster, safer and more efficient. The speed limit on highways in Romania is of 130 km/h, while on expressways it may not exceed 110km/h. One could say that there is not a big difference between these and European roads, where the speed limit is 100 km/h, however expressways are usually 2x2 lane roads, making it not only more efficient, but also a lot faster to reach one's destination. It is worth mentioning, that these roads do not cross any settlements. Although the EU does currently not fund building expressways, there is a possibility that in the future there will be funds raised for such. Based on the data provided by the NCMNR there are 11 expressways in Romania. The total estimated cost for the construction of a total of 761 km expressways is of 7553 mil. Euro.

Table 1. Romania's Motorways (Expressed in Kilometers)

Length of motorways	Completed	Under construction	Planned
A1: 576,1	195,7	144,1	236,3
A2: 203	203	-	-
A3: 581,6	107,5	79,2	394,9
A4: 74,8	21,8	-	53
Total: 1435,5	528	223,3	684,2
Proposed			
Jucu – Bistrita: 75	-	-	75
Ploiesti – Albita: 288	-	-	288
Targu Mures – Iasi – Ungheni: 310	-	-	310
Total: 673	-	-	673
TOTAL: 2108,5	528	223,3	1357,2

Source: Romanian National Company of Motorways and National Roads

2. Theoretical and Methodological Aspects

The Treaty of Rome in Chapter IV, Articles 74-78, establishing the European Economic Community, set up the fundamental principles of the Common Transport Policy in 1957. "Article 3 of the Rome Treaty has declared not only the aim of concluding common objectives on transport policy in regards to road, rail and inland waterway transport, but also considered it as an obligation." (Vincze, 2008, p. 152) In June 1985, the European Commission published a White Paper on completing the internal market, making transport policy a key piece of the overall community strategy. In the late 80s, a discussion on infrastructure development Trans-European Networks has been initiated, also including the field of transport. Tamas Fleischer in his study „The Trans-European Corridors" tells us that in 1991

a three-level negotiation process, also named the Pan-European Transport Conference, has started, during which the plans regarding Pan-European Corridors, also called "Helsinki" corridors, has been accepted. The first conference took place in 1991 in Prague, the second in 1994 in Crete and the third in Helsinki in 1997. (Fleischer, 2007, p. 371) In the White paper on "Development of the Common Transport Policy" from 1992 the following common objectives were established: removal of the remaining dysfunctions in terms of internal transport network of the European Community, creating an efficient transport system that contributes to the free movement of goods, persons and services, encouraging competition in the intra-Community transport industry. (European Institute of Romania, 2005, p. 15)

In 1995 the European Commission published a second White Paper on "Fair charging for infrastructure use: a phased approach to a common framework for infrastructure use in the EU", in which the Commission debated the issue of a harmonized Community approach to taxation in the transport sector.

Before the 1990s there had only been two highways opened: Bucharest – Pitesti: 96 km and Fetesti – Cernavoda: 17, 2 km. During the period of 1990-2000, these works were on stand-by. After the year, 2000 highway constructions have started again. Already in the period 2004-2012, there had been many innovations in the field of transport infrastructure, which lead to new highway openings, but the period 2013-2021 looks even better.[1] The objective of the study is to present the state of the Romanian motorway infrastructure especially in the Central and North-Western Regions in 2013. Furthermore, the aim is to present a projected course of the constructions up to 2021, comparing the periods between 2004-2012 and 2013-2021. Another important aspect of the study is presenting the projected end dates of the construction works. A legitimate hypothesis could be, according to the statistics of the previous years, that currently in Romania and in the regions included in our study most of the highways are only in the planning phase, followed by areas in construction and completed highways and ones that have been put into use occupy last place. When comparing the periods between 2004-2012 and 2013-2021 in regards to highway construction, we believe that work scheduled for the period 2013-2021 will be performed in a higher pace than in the previous period. There are already several suggestions that have been made, more sectors are under construction[2], and consequently Romania's highway infrastructure should develop by leaps and bounds compared to the past years. It is also worth thinking about the

[1] We did choose the periods 2007-2013 and 2014-2020 because in the regions chosen for the study the highway works have started in 2004 and we are analysing sectors completed up to the year 2012, a period of 8 years. 2013-2021 is the next 8 year long period, therefore we have chosen to work with these periods.

[2] A1: Sibiu – Orastie, Orastie – Deva (paritally in traffic), Deva – Lugoj (partially under construction), Arad – Nădlac (paritally under construction).
A3: Bucharest – Ploiesti (paritally in traffic), Gilau – Mihailesti (partially under construction), Suplacu de Barcau – Bors.

completion date of these highways. An important question would be, if the works on sectors funded by the EU were advancing faster as the ones funded by the government. Another supposition would be that if there would be sufficient Romanian funds for the construction of these highways, these works could advance in the same pace as the ones supported by the EU. Our hypothesis is that sectors funded by the EU are progressing faster due to financial reasons. We can presume that the works do not need to progress evenly on the national level, since there are regions, where building these roads is a priority, for example highway A2, named also Highway of the Sun, which connects the capital city with one of the biggest port-towns, Constanta.

Nowadays we can already speak of several completed highway sectors. The number of these progress sectors is permanently increasing, as highway works are currently in progress. In the first part of our study, we presented the infrastructural situation of the year 2013 in Romania. Moreover, we gave details on Romania's open highways, as well as the ones under construction and proposed. We also spoke of expressways, as they have their own importance, especially when finished. Furthermore, we wish to draw a comparison between the highway infrastructure of the Central and the North-Western regions, wherein highways A1's and A3's completed sectors, sectors in the building phase and planned sectors. Based on this information we will present some statistics to support and serve as an answer to our hypothesis. Using the results of this study, we will present a future plan/completion date of Romania's highways, which are in the planning phase for the moment. We will compare the values of Centre and North-Western regions with national ones in regards to finished highways, ones in progress and ones proposed, consequently we will analyse if works between 2004-2013 or the ones between 2013-2021 were progressing/ will progress better. Our analysis will be based on data taken from the NCMNR in March 2013.

3. The A1 and A3 Motorways in Romania

The A1 highway is situated alongside the 4th Pan-European transport corridor[1], which has its starting point at Dresden/ Nürnberg and ends at Istanbul, on Romanian grounds from Arad to Constanta. This route is also a part of the Trans-European Transport Network[2], linking Greece with the Hungarian capital. This

[1] The EU`s Pan-European Corridors policy (road, rail, air and water transport networks) extends to the EU neighbours: Accession countries, the European Economic Area (Norway, Iceland and Liechenstein), the Balkans, the Mediterranean Partner Countries and the Eastern Neighbourhood. (hp://www.eib.org/projecs/priorities/ens/index.hm).

[2] The EU's rans-European Networks (ENs) policy links regional and national infrastructure to create coherent European systems. This includes boh interconnection and interoperabiliy, mainly for transport (road, rail, air and water transport networks) and energy. (hp://www.eib.org/projecs/priorities/ens/index.hm).

highway crosses the following cities: Nadlac – Arad – Deva – Sibiu – Pitesti – Bucuresti and has a length of 576, 1 km. A large portion of this road section is still under construction. In the Central region for the moment, there is only a 17, 2 km sector, the bypass of Sibiu, completed in 2010. By the year 2013, several smaller sectors have been completed in the Western development region. The 82 km long section between Sibiu and Orăștie has also been planned to be opened for traffic during the 2013-2014 period. The total length of the highway in this region is of 99, 2 km, including Sibiu`s bypass.

The A3 highway connects Bucharest with the Borş, a settlement situated in the North-Western region, on the following route: Bucuresti – Ploiesti – Brasov – Fagaras – Sighisoara – Targu Mures – Campia Turzii – Gilau – Suplacu de Barcau – Borș. The total length of the highway is 581, 6 km. In the Central development region we can speak of 4 segments between the following cities: Braşov – Făgăraş: 53 km, Făgăraş – Sighişoara: 52 km, Sighişoara – Targu Mures: 56 km, Targu Mures – Câmpia Turzii: 36 km. The total length of the highway in the Central region is of 197 km, but in year 2013 no construction for these sectors has been started. In the North-Western region there are a further 4 segments located. These segments connect the following cities: Câmpia Turzii – Gilău: 52 km, Gilău – Mihăileşti: 24 km, Mihăileşti – Suplacu de Barcău: 76 km and Suplacu de Barcău – Borş: 64 km. In 2009-2010 the segment Câmpia Turzii – Gilău has been opened for traffic; in addition, there is work in progress on the segments Borş – Suplacu de Barcau and one part of the Gilau – Mihăileşti segment. Total length of the highway in the North-Western region is of 216 km.

4. Empirical Results

In the Central and North-Western regions the motorways are totalling 512,2 km, out of which 69,2 km has been opened to traffic, while 170 km is under construction and 273 km are still being planned. If we take the 512, 2 km as 100% we get the following results: 69.2 km - 13.51%, 170 km - 33.19%, 273 km - 53.30%. Highways on Romanian ground reach a total length of 1435, 5 km: 528 km has been opened for traffic, 223, 3 km is under construction and a further 684, 2 km is planned. If 1435, 5 km makes out 100%, then: 528 km – 36, 78%, 223.3 km – 15, 56%, 684,2km – 47, 66%. It is important to note that these calculations also include two highway segments built before 1989, which also add 113, 2 km to the total length of highways in the country. The slow progress in the highway construction is caused by the lack of financial resources, as the A3 is greater in length than the A1. As we know, there are currently no EU funds for the A3. When comparing statistics on highways in the two regions[1] with statistics on a national level one can see that on national level the ratio is higher than the two regions

[1] Central and North-Western regions.

chosen for our study. According to our hypothesis highway constructions across the country do not need to progress evenly in all regions. This premise is backed up by the fact that the proportion of highways already in use in some regions are much higher than in the ones we are analysing. This is because there are segments completed before 1989[1] and segments that had been prioritized, such as the Highway of the Sun, connecting Bucharest to one of the largest port-towns, Constanta. The latter is also part of the TEN-T, another reason why it could have higher priority. Highway A1 crosses only a small portion of the two regions, its total length in these regions is of 99, 2 km, out of which 17, 2 km has been opened to traffic and 82 km is under construction. In the same time, a portion of 52 km of the A3 highway has been opened to traffic in the two regions. Another 88 km is still under construction, meaning that 69, 2 km has been released and 170 km is under construction, leading to the result that in these regions the ratio of highways under construction is higher than highway segments opened to traffic. The ratio of planned highways on a national scale is lower than the ones in the Central and North-Western region. This is due to the fact that no highway construction has yet started along the A3, meaning that 197 km awaits for construction and in both regions a total of 273 km has been planned for construction.

When will these highways, currently under construction, be completed?

As we might know, the main goal of the EU is to finish the construction of the A1 highway, due to its international importance, as part of the 7th TEN-T and the 4th Pan-European transport corridor. As the A3 is being wholly funded by the Romanian Government, the works progress slower due to financial hardship. This is because the EU invests mainly in developing Trans-European Transport Networks and Pan-European transport corridors.

The table below indicates highway segments completed up to 2013 March.[2]

[1] Bucharest – Pitesti: 96 km, Fetesti – Cernavoda: 17,2 km.

[2] Highways Bucharest - Pitesti and Feteşi – Cernavodă, built before 1989, have not been taken into consideration.

Table 2. Highway Segments Completed up to 2013 March

Sections	Timetable	Calculations
European Union & Romanian Government		
Bypass Pitesti: 13,6 km	2004 – 2007 (3 years)	13,6 / 3 = 4,53 km (1 year)
Bypass Sibiu: 17,2 km	2004 – 2010 (6 years)	17,2 / 6 = 2,86 km (1 year)
Simeria – Deva: 14,8 km	2011 – 2012 (1 year)	14,8 / 1 = 14,80 km (1 year)
Bypass Timisoara: 9,5 km	2011 – 2012 (1 year)	9,5 / 1 = 9,5 km (1 year)
Timisoara – Arad: 32,3 km	2009 – 2011 (2 years)	32,3 / 2 = 16,15 km (1 year)
Bypass Arad: 12,3 km	2009 – 2012 (3 years)	12,3 / 3 = 4,1 km (1 year)
Bucuresti – Constanta: 185,8 km*	2001–2012 (11 years)	185,8 / 11 = 16,89 km (1 year)
Bypass Constanta: 19,8 km**	2009 – 2012 (3 year)	19,8 / 3 = 6,6 km (1 year)
		75,43 / 8 = 9,42 km
Romanian Government		
Bucuresti – Ploiesti: 55,5 km	2007 – 2012 (5 year)	55,5 / 5 = 11,1 (1 year)
Gilau – Campia Turzii: 52 km	2004 – 2010 (6 years)	52 / 6 = 8,66 (1 year)
		19,76 / 2 = 9,88 km

- Fetesti – Cernavoda 17, 2 km built before 1989

- An additional segment between Lazu and Constanta Port is under construction. The total length is 2 km and the completion date is 2013.

Source: Romanian National Company of Motorways and National Roads

Based on the above we made some calculations on the length of highways built using or without using EU funds in the period 2004-2012. In the first case, there are 9, 42 km built in one year, in the second case 9, 88 km. Studies have shown, and this also being our assumption, that construction progress is slow due to lack of funds. Our study also supports this idea. Our results show that in each case we can expect an approximate 9 - 10km/ year of highway to be built, meaning that if the country would be in possession of enough funds, there could be just as many highways built relying on own funds than out of EU support. This last affirmation again supports our assumption, that slow progress is due to lack of financial resources. Note: These results are only valid if the construction work is considered linear.

At the moment there are two perspectives in regards to transport policy, as follows:

1) Perspective – establishment of the transport infrastructure and advancement in the economic development.
2) Perspective – in terms of economic development the establishment of the transport infrastructure is seen as risky, more precisely: what happens if the highways are built and there won't be economic growth?

In our opinion a well developed infrastructure is vital for good economic collaboration (see perspective nr. 1). Taking into consideration the economic points of view one ought not think in big highways, because transport is not profitable as the costs are high in case the starting- and endpoint are far away from another, and the time spent on travelling is high. Furthermore, if there would be a well-developed, established infrastructure (roadway/ railway), then the inhabitants in the vicinity of border crossing points would be able to go to work in the nearby countries. Given the adequate infrastructure, production capacity can be moved from one country to another. Good examples for the aforementioned are Debrecen – Oradea: North-Western region (73 km), Szeged – Arad: Western region (108 km) and Szeged – Timisoara: Western region (116 km). The travel time between these cities is less than one hour due to the properly developed roadway/railway infrastructure. Considering the above it would be important that the A3 highway to be built in the North-Western region, between Oradea and Bors cities.

To talk about the second perspective we would like to take Spain as an example. A part of the highways aren't situated alongside any important trade centers – we could also say, that they are crossing through a "deserted" territory. We have, for instance, the highway between Barcelona and Valencia, which was meant to aid the transfer of funds from north to south. The only issue was that the opposite of the proposed effect has actually taken place: thanks to the highways, work force from Barcelona moved to Valencia. Integrated transport policy is worth mentioning in Spain's case. The highways were built in the country, but the access roads remained undeveloped. However access roads need to be developed while building the highways, in order for larger railway stations to become accessible by highway without any difficulties.

5. Conclusions

Based on the data published by the NCMNR we have come to the conclusion that in the year 2013 in the Central and North-Western regions the percentage of the highways proposed reach 53,30%, followed by highways under construction – 33,19% and highways already completed – 13,51%. These numbers coincide with our hypothesis. The ratio of highways under construction is higher in the Central and North-Western regions than in the rest of the country, which leads to the conclusion that construction works are conducted in higher pace than in other regions

In the year 2013, more than half of the highways are only being planned. If we take in consideration the highways that have been proposed, adding additional 3 segments, then one can conclude that highways under planning occupy the first place in the rank with more than 50%. Comparing highways on a national scale with the ones in these two regions[1] we came to the conclusion that there is a higher ratio of highways released for traffic to be found on a national scale than in these two regions chosen for this study. On the other hand, work in progress prevails in the Central and North-Western regions, as well as highways currently in the planning phase.

We can say that highways currently planned will be finished around the year 2017 at earliest, latest in 2021, in case construction will start in 2013. In this calculation, we have not included highways under construction, as they are in progress for the moment. We have included the numbers out of the completed highway segments and we are analysing the planned highway segments. The estimated time of completion for the highways under construction would be around years 2013-2015.

Table 3. Completion Date of Planned Highways

A1 and A3 highway Central and North-Western regions	Calculations (completion date - estimate)
A3: Central region, funding: Romanian Government	
Braşov – Făgăraş: 53 km, planned	53 / 9,88 = 5,36 => 5 years => 2018
Făgăraş – Sighişoara: 52 km, planned	52 / 9,88 = 5,26 => 5 years => 2018
Sighişoara – Targu Mures: 56 km, planned	56 / 9,88 = 5,66 => 6 years => 2019
Targu Mures – Câmpia Turzii: 36 km, planned	36 / 9,88 = 3,64 => 4 years => 2017
A3: North-Western region, funding: Romanian Government	
Mihăileşti – Suplacu de Barcău: 76 km, planned	76 / 9,42 = 8,06 => 8 years => 2021

Source: Our Calculations

In the past couple of years, construction of highways in Romania has started developing much faster. This study has shown that construction was slow between the years 2004-2012, in 8 years there were only 193, 6 km of highway opened for traffic. Compared to this, the period 2013-2021 seems to bring more improvement in this matter. Our assumption was that between the years 2013-2021 there will be more highway segments built than during the period of 2004-2012, so we have

[1] Completed, planned and under construction.

concluded that according to our calculations, as well as based on NCMNRs statistics, there would be a total length of 273 km finished by the year 2021. If we consider the 273 km as 100%, then 193, 6 km would make out 70.91% of this, the remaining 79, 4 km would be 29.09%, almost 30%. According to our calculations, there would be a growth of 30% in the construction of highways in the two regions, meaning that there will be an additional 79, 4 km of highways built in comparison with the previous period. The growth for the moment is very slow for Romania to reach the EU average. There is a need for much more highways and expressways in the near future in order to have a considerable improvement of the national traffic infrastructure. The graph below shows that if the construction work starts in 2004 and 2013 from 0 km, then it will be faster paced in the period during the period of 2013-2021 than previously that's the reason why the red line is "steeper" than the blue.

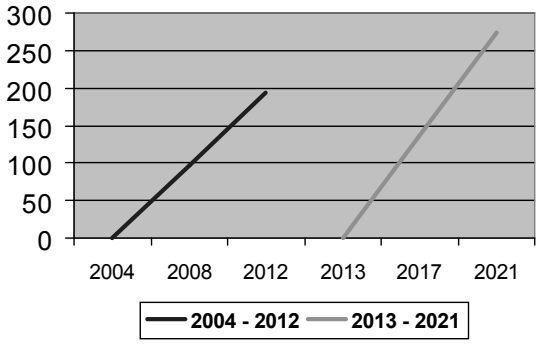

Figure 1. Highway Constructions during the Period of 2012-2021 against 2004-2012

Source: Our Calculations

Note: These results are only valid if the construction work is considered linear.

Highways need to be built in such a way that they can connect leading commercial centers (which are of high economical importance) with another. If one of such cities is left out of the highway network, it can lead to serious economic consequences. An example for this is the A1 highway and Cluj-Napoca. Information received from NCMNR, approved on a national level by the European Commission, presents the construction of motorways in Romania in the coming years. The TENT-T network will be realized on a highway profile until 2030, while the horizon of implementation of the global TEN-T on a highway profile was planned for the year 2050 (according to the information provided by NCMNR). The highway segment pointed out by NCMNR doesn't cross Cluj-Napoca, however it connects to highway A3, located in Turda in the North-Western region, leading towards Iasi and conclusively offering Cluj-Napoca a connection to the A1 highway.

6. Observations

In our study, we are working with data taken from the NCMNR from March 2013. At this time there were 27, 6 km under construction on the A1 highway, segment Deva – Lugoj and 71, 9 km in plan. In June 2013 the whole segment turned its status to under construction highway segment. A 19, 8 km segment of motorway was finalised and another 2 km were under construction in March 2013 on the A4 motorway, between Ovidiu - Portul Constanța. In July 2013, the entire 21, 8 km segment of Constanta bypass had been completed. On the 23rd of May the contract with America's Bechtel for the construction of the A3 Highway, Suplacu de Barcau – Borș section, was terminated. In May 2013 the construction work between overall Deva – Orăștie section was finished.

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Compete or Leapfrog: Creating Blue Ocean through Entrepreneurial Orientation

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Abstract: The study analyzes the role of entrepreneurial orientation with mediating effect of knowledge creation process to creating Blue Ocean in corporate sector in Pakistan There is an increasing competition among companies due to globalization and technological advancements. Thus, it requires a study to measure the multifaceted influence of entrepreneurial orientation on knowledge creation process and Blue Ocean besides the actual paradigm of this terminology. This concept has been well discussed in this research arena since its inception in 2005. Numerous such initiatives have already been taken, however this concept invites a lot more addition, related companies are still in pursuit to materialize the research concepts. We highlight the contingencies in the shift from a red ocean to Blue Ocean. The study uses exploratory approach; primary data is collected from 391 professionals working in different sectors of Pakistan. The study uses structural equation model (SEM) technique to test the hypotheses. The study found a positive relationship between entrepreneurial orientation and Blue Ocean, entrepreneurial orientation, knowledge creation process, and Blue Ocean. The study throws light on the importance of entrepreneurial orientation and knowledge creation process to head on this fast-paced competition.

Keywords: Entrepreneurial Orientation; Knowledge Creation Process; Innovation; Organizational Performance; Blue Ocean Strategy; Blue Ocean

JEL Classification: L26

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1. Introduction

The nudge for businesses to not only offsetting the competition but also staying one-step ahead of competitors comes from the conception of expedited competition and technological advancements in the 21st century. In this era of globalization and the more fierce "global recession" businesses have to face ferocious competition, poorer profitability, and lesser market potential in their specific industries (Ayub et al. 2013). Businesses now days are not confined to their native boundaries instead are operating overseas, consequently resulting in increased product lines/ offerings, hence a variety of alternatives available for their customers.

Service provision in addition with a quality product is central to their core operations. Some businesses are competing against each other in providing quality products while others in providing value added services to their target customers. Businesses especially in under developed countries are not more than a services encounter. The focal is just only competing over the competitors somehow. No doubt, both the products and the services are the core and supplement aspects of businesses. However, in lieu of competitive eccentricity, businesses have to broaden their visionary approach in any of their hard-core contexts *i.e.* administration, products, services, operations, intelligence, technology, innovation etc.

Henceforth, businesses not only necessitate a sustainable growth but also a quantum leap into a new market space. A metaphor in the business parlance is Blue Ocean; defined by Kim and Mauborgne (2004) as "an uncontested market space for an unknown industry or innovation." Businesses therefore are required to look beyond the competition into the Blue Ocean just like Bill Gates "the Founder of Microsoft", one of the greatest business Tycoons of this era. This can be done by using a collaborative approach of need analysis (analyzing the needs and wants of customers) and need creation (creating a need for customers, which they even can't expect). Thus, at the heart of this replica is the untapped market *i.e.* blue ocean.

Majority of research work by Kim and Mauborgne (2004) has been discussed, presented, and implemented on blue ocean strategy *i.e.* achieving Blue Ocean through yellow tail strategy, four action framework, and strategy canvas etc (Sheehan & Vaidyanathan, 2009; Abraham, 2006). However, this study introduces a new model, which combines entrepreneurial orientation and knowledge creation process with Blue Ocean. Much research has been conducted on entrepreneurial orientation and organizational performance (Lumpking & Dess, 2001; Wiklund &Shepherd, 2003; Zahra & Coving, 1995). Barringer and Bluedorn, 1999; Wiklund and shepherd, 2003; Zahra and Garvis, (2000) further validate the construct that entrepreneurial orientation can be an important measure of how businesses exploit and discover market opportunities.

In addition, services and new products development involves intensive and extensive knowledge activities (Li et al., 2008). Studies have also suggested a positive impact of knowledge management on innovation performance. Madhoushi et al. (2011) have confirmed the mediating role of knowledge creation process between entrepreneurial orientation and innovation process. Thus, the current study tries to construct a link between entrepreneurial orientation, knowledge creation process, and Blue Ocean. To leap into Blue Ocean, businesses have intensified their search for strategic orientation *i.e.* entrepreneurial orientation that will give them a sustainable competitive advantage.

Thus, this study addresses the construct by analyzing the role of entrepreneurial orientation with mediating effect of knowledge creation process on Blue Ocean. The following research questions are central to this study:

1. How the contingency in the shift from red ocean to blue ocean be taken place?
2. What is the influence of entrepreneurial orientation on knowledge creation process?
3. What is the role of entrepreneurial orientation on knowledge creation process and Blue Ocean?

The next sections discuss theoretical background, hypotheses development, theoretical model, research methods, results and discussions, and finally study concludes with important findings and managerial implications.

2. Theoretical Background and Development of Hypotheses

We can't solve problems by using the same kind of thinking we used when we created them. The inception point of Blue Ocean can be traced in 2005 when Kim and Mauborgne based on a study of 150 strategic moves introduced Blue Ocean Strategy. The motive behind Blue Ocean was the shifting paradigm of markets across overseas, resulting in expedited competition among businesses. In today's congested industries, competition head on results nothing but a "red ocean" of foes competing with each other for a shriveling pool of profits. Thus, there arises an intense need for businesses to give a nudge to their strategic moves from red oceans to Blue Oceans where they solely can be the monopolists.

Wim and Mauborgne (2005) argued that there are neither eternally excellent industries nor eternally excellent companies; they only rise and fall based on their strategic moves. Extending this idea it is suggested that strategic moves consist of various actions and decisions taken by management in making a major market creating business offerings (Abraham, 2006; Sheehan & Vaidyanathan, 2009) and value innovation. Leavy (2005) stated that value and innovation for Blue Ocean

strategy are inseparable *i.e.* value innovation puts equal emphasis on innovation and value.

Accordingly, the study focuses on five dimensions of Blue Ocean given by Win and Mauborgne (2005).

1. Industry assumption (business' perception about conditions of any particular industry can be shaped);
2. Strategic focus (strategic leap into an uncontested pool of buyers to dominate the market);
3. Customers (opting for the mass buyers in terms of embracing key commonalities of customers values);
4. Assets and capabilities (a sky-scraping visionary approach of thinking free from existing assets and capabilities of businesses to carry out something new-fangled);
5. Product/services (offering solutions to buyers' major bottlenecks).

2.1. Entrepreneurial Orientation and Blue Ocean

Recently, managers are fervent in their organizations to practice entrepreneurial activities due to a variety of critical problems they come upon *i.e.* rapid growth of new rivals in market place, ongoing escalating weaknesses in conventional methods of management, needs of vivid and spectacular changes and innovations, and increased global competition (Kuratko & Welsch, 1994; Kuratko & Hodgetts, 2001). Lumpkin and Dess (2001) referred entrepreneurial orientation as the processes and activities of businesses that employ entrepreneurial behaviors and actions. Much research has been conducted on entrepreneurial orientation because of the fact that it has been recognized by managers and practitioners as a strategic move for sustainable growth and success for businesses. Many other studies including Coving and Miles (1999); Wiklund and Shepherd (2005) stated businesses that have high entrepreneurial orientation render high willingness to innovate, to opt for new mass of buyers, to take risks, and to be highly proactive towards opportunities in the marketplace.

The study focuses on the five dimensions of entrepreneurial orientation *i.e.* innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy for achieving Blue Ocean in this fast-paced business environment. Knight (1997) defined innovativeness as creativity and uniqueness in offerings in order to encounter threats that businesses face. In lieu of uniqueness and creativity, Lumpkin and Dess (2001) argued EO to be the willingness in support of creativity and experimentation for introducing new products and services, for achieving technological leadership and R&D in the development of new processes.

Furthermore, Madhoushi et al. (2011) emphasized on the significance of entrepreneurial innovativeness in developing new capabilities to achieve higher performance.

Entrepreneurial firms or entrepreneurs are high-risk takers; hence develop different products and services targeted to new market segments/ niches (Miller, 1983; Morris & Kuratko, 2002). Lumpkin and Dess (1996) referred proactiveness as the dimension of entrepreneurial orientation to be the business' agility in anticipation of dramatic changes and future needs and problems. Moreover, competitive aggressiveness is the tendency of a business to outperform rivals in the marketplace by intensely and directly challenging its competitors (Certo et al., 2009). In addition, Certo et al. (2009) stated entrepreneurial autonomy as the independent inclination of a team or individual in bringing forth a vision and seeing it through completion.

2.2. Entrepreneurial Orientation, Knowledge Creation Process, and Blue Ocean

The concept of creating Blue Ocean is viewed and practiced with different variables including four action framework, strategy canvas etc. This study introduces a new model, which combines entrepreneurial orientation, knowledge creation process, and Blue Ocean. This is a unique study in the context that it introduces a new strategic approach through entrepreneurial orientation, the theoretical model of the study is presented in Figure 1. Researches proved that entrepreneurial orientation is critical for new ventures to facilitate the exploitation of new and existing knowledge in order to discover numerous market opportunities (Wiklund & Shepherd, 2005). Wiklund and Shepherd (2005) proposed that knowledge creation process *i.e.* socialization, externalization, combination, and internationalization describes twisting interactions between precise and inferred knowledge. Zhang et al. (2004) stated that socialization processes such as brainstorming sessions, direct interactions help employees to share and exchange valuable knowledge, consequently results in value innovation.

In the course of externalization, employees can articulate implicit knowledge into considerable concepts and notions by enhancing understating in new products developments or idea generations (Nonaka & Konno, 1998; Nonaka & Toyama, 2005). Furthermore, Li et al. (2008) emphasized on the significance of combination and internalization process in making innovative ideas more exploitable and promoting the actualization of innovation and development within the organization. Additionally, Li et al. (2008) stated that new products and services development involves extensive and intensive knowledge activities. Thus, the current study investigates the nexus between entrepreneurial orientation, knowledge creation

process, and Blue Ocean in one theoretical model. The hypotheses in Table 1 can be developed based on previous theoretical discussion.

Table 1. Development of Hypotheses

Hypotheses	Statements
H1	Knowledge creation process is positively influenced by entrepreneurial orientation
H2	Entrepreneurial orientation positively correlates with Blue Ocean
H3	Knowledge creation process positively correlates with Blue Ocean

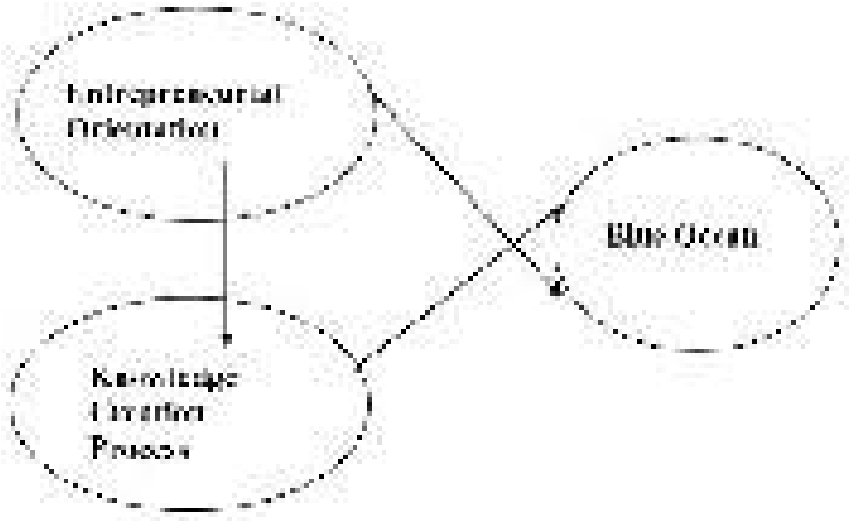

Figure 1. Entrepreneurial Orientation, Knowledge Creation Process, and Blue Ocean

3. Research Methodoly

3.1. Sample and Sampling

The study is conducted to analyze the influence of entrepreneurial orientation on knowledge creation process for achieving Blue Ocean. This is an exploratory research based on primary data. The primary data is collected from professionals working in different corporate sectors of Pakistan. The sampling population is the employees working in different organizations. A sample of 500 employees and survey questionnaire distribution process was personally administered by the research team. A total of 391 usable survey questionnaires were returned leaving a

response rate of 78%. The authors used convenience-sampling technique to select respondents. The sample included respondents from genders, diverse backgrounds, and different industries so that results can be generalized. In two phases, the survey was conducted, in first phase the self-explanatory questionnaires were distributed among respondents. In second phase, the questionnaires were collected from respondents after a reasonable time. Moreover, a reminder was also given to respondents to ensure maximum response.

3.2. Measurement and Instrument

3.2.1 Dependent Variable

There are two dependent variables in the study, firstly knowledge creation process because this study analyses the dynamic effects of entrepreneurial orientation on knowledge creation process. Secondly, Blue Ocean is also dependent variable in this study because this study analyses the role of entrepreneurial orientation with mediating effects of knowledge creation process in achieving Blue Ocean. The instrument to measure knowledge creation process has been adopted from Li et al. (2008). The instrument contains 16 items addressing different dimensions on knowledge creation process and is measured on 5-point Likert scale (1 for Strongly Agree and 5 for Strongly Disagree). The second dependent variable in this study is Blue Ocean, which has been measure on 5-point Likert scale (1 for Strongly Agree and 5 for Strongly Disagree). The instrument contains 8 items; the scale is manipulated based on the dimension given by Wim and Mauborgne (2005).

3.2.2 Independent Variable

The study analyses the role of entrepreneurial orientation with mediating effects of knowledge creation process on Blue Ocean, therefore the independent variable in this study is entrepreneurial orientation. The instrument to measure entrepreneurial orientation has been adopted from Li et al. (2008). The instrument contains 13 items addressing different dimensions on entrepreneurial orientation and is measured on 5-point Likert scale (1for Strongly Agree and 5 for Strong Disagree).

3.3. Data Analysis

The data collected was initially fed into SPSS software and transformation of variables was done to make it usable for AMOS. Structural equation model (SEM) technique was used to analyses data and test hypotheses. The structural equation model is an important technique for identification of variables and development of theoretical model (Rehman et al. 2010).

4. Results and Discussions

The study is undertaken to analyze the role of entrepreneurial orientation with mediating effects of knowledge creation process in creating Blue Ocean in corporate sector in Pakistan. The correlations analysis is produced in Table 2. Table 2 shows positive correlation between entrepreneurial orientation, knowledge creation process, and Blue Ocean. The analysis of data is given in Table 3 and structural equation model (SEM) is presented in Figure 2. Table 3 shows very encouraging results. The value of P should be less than 0.05 in order to accept any hypothesis. All three value of P in Table 3 are well below than 0.05, therefore we accept our hypotheses H1, H2, and H3. H1 refers towards the positive relationship between entrepreneurial orientation and knowledge creation process, which is confirmed by this analysis. H2 refers towards the positive relationship between entrepreneurial orientation and Blue Ocean, which is confirmed by this analysis. Finally, H3 describes positive relationship between knowledge creation process and Blue Ocean, which is also confirmed by Table 3. Figure 2 describes the positive nature of relationship among all three variables in structural equation model form. The results of reliability analysis are also very sound with 0.955 value of Cronbach's Alpha of all 3 vaiables that were used in the scale. The results of this study are quite encouraging and well supported by previous studies for instance; Coving and Miles (1999); Lumpkin and Dess (2001); Wiklund and Shepherd (2005); Li et al. (2008) stated that entrepreneurial orientation influences knowledge creation process and results in privileged creativity and innovation.

Table 2. Correlations

		EO	KCP	BO
EO	Pearson correlation	1		
	Sig. (2-tailed)			
	N	[illegible]		
KCP	Pearson correlation	[illegible]	1	
	Sig. (2-tailed)	[illegible]		
	N	[illegible]	[illegible]	
BO	Pearson correlation	[illegible]	[illegible]	1
	Sig. (2-tailed)	[illegible]	[illegible]	
	N	[illegible]	[illegible]	[illegible]

**Correlation is significant at the 0.01 level (2-tailed).

Table 3. Regression Weights

Hypotheses		Estimate	S. E.	C. R.	P	Decision
H1	KCP < --- EO	0.794	.020	39.426	.000	Accept
H2	BO < --- EO	0.260	.024	10.663	.000	Accept
H3	BO < --- KCP	0.447	.027	16.289	.000	Accept

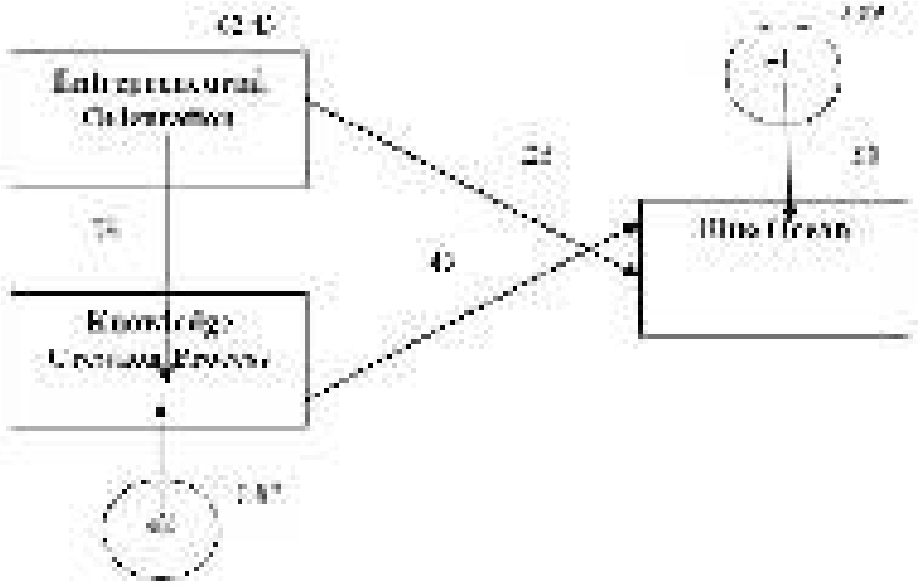

Figure 2. Structural Equation Model

5. Conclusion

This study is conducted to analyze the role of entrepreneurial orientation in creating Blue Ocean through knowledge creation process. It is the important study in the context that it provides additional and significant insights to management about the importance of entrepreneurial orientation in creating Blue Ocean besides the actual paradigm of this terminology. The study found highly significant positive relationship between entrepreneurial orientation and Blue Ocean, entrepreneurial orientation, knowledge creation process and Blue Ocean. Thus, these findings are very meaningful for managers and entrepreneurs, and for researchers. The study demonstrates that businesses not only can cope up with fast-

paced competition but also can stay ahead of their rivals by leaving competition far behind through entrepreneurial orientation. Moreover, it also provides useful references for future researchers on this subject matter.

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Capital Market Development: A Spur to Economic Growth in Nigeria

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Abstract: This paper examines the relationship between capital market development and Nigeria's economic growth using data covering the range of 1981 to 2010 using a Johansen Cointegration technique to test for long run relationship among the variables under study. The empirical findings from the research work suggest that the capital market is an essential catalyst for economic growth and is on the average and beneficial to the economy. However, the high costs of raising capital and structural imbalances in the market as well as inconsistent government policies may distorts the speedy growth of the market and thus, limit its positive impact on the economy.

Keywords: Financial Institutions; Economic Growth; Cointegration; Nigeria

JEL Classification: C01; E44

1. Introduction

Economic development is said to require long-term plans, which in turn needs long term investments. In a developing economy like Nigeria, there is the additional requirement for foreign direct investment in order to meet the lacuna created by the inadequacy of the local savings for propelling investment, which is a motivating factor to rapid economic development and growth. For Samuel (1999), a developed and functioning financial infrastructure (financial market) is important for propelling economic development through the mobilization of savings and efficient allocation of these savings for production. Despite the afore discussed importance of long-term capital mobilization and the role of financial institutions, it may be noted that there is no consensus in literature on the effects of the capital market (as a financial institution) on economic growth. At the firm level, Gurly and Shaw (1967) and Shaw (1973) emphasize the importance of the role of financial

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institutions in positively contributing to economic growth. Some others including Shleifer and Summer (1988), Bhide, (1993) and Mayers (1988) find to the contrary. Indeed, Stiglitz (1994) and Killick and Martins (1990) are of the opinion that the growth of capital markets can be detrimental to corporate organizations. At the macroeconomic level, Kolapo and Adaramola (2011), Atje and Jovanovich (1993) and Adeniyi (2010) report positive correlation between the variables. On the other hand, the study by Alajekwu and Achugbu (2012) reports that market capitalization and value traded ratios have a very weak negative correlation with economic growth.

Thus, there is a need to determine whether or not, the Nigerian capital market has had any significant positive impact on the Nigeria economy during the study period. In addition, the study will examine the factors responsible for the market growth, especially in view of the series of financial policy reforms in the country. The market reforms have recapitalization as part of its cardinal focus (which so many studies that focused on the capital market growth seem to have omitted overtime). This study therefore, attempts to fill this gap, by incorporating the financial policy implication (i.e. bank recapitalization) and other factors responsible for the changes in the Nigerian capital market and thereafter, determine the research examines the impact of the capital market on the economic growth of Nigeria. The remainder of the paper is organized as follows. Section two deals with the background analysis of study and section three deals with the literature review. In Section four, the theoretical and methodological framework of the study is presented while the empirical results are discussed in section five. Section six concludes the paper.

2. Analysis of the Nigerian Capital Market

The market started operations formally in June 1961 with eight (8) securities (five government bond, zero industrial loan stock and three equities) that had been previously quoted in the London Stock Exchange. The major types of securities listed on the NSE since its establishment is government loan stock, industrial loan stock and equities. From the modest beginning in 1961, the number of listed securities have increased in leaps and bounds from 8 at inception to 52 a decade later and 264 by end 2010 (Figure 1)

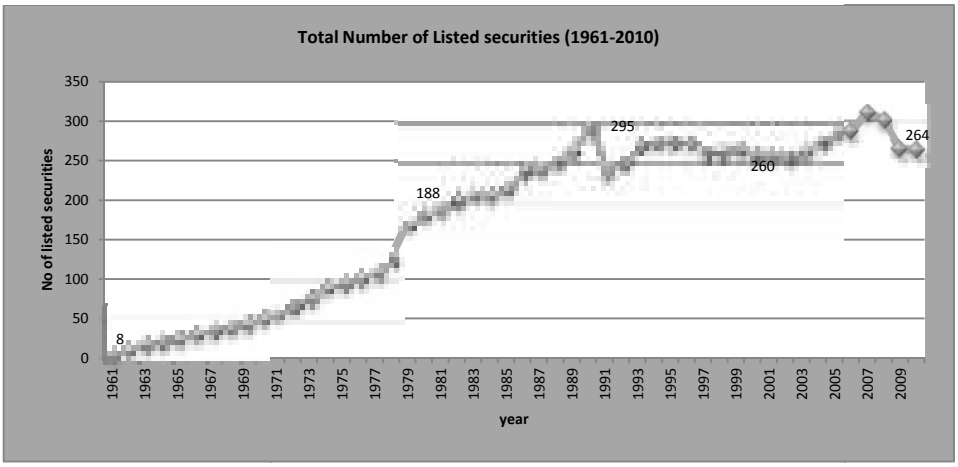

Figure 1. Total Number of Listed Securities 1961-2010

Source: Author's Analysis (Data Extracted from NSE, 2010)

The composition of listed securities also changed rapidly during the period. For example, in 1961, about 63% of securities were in the form of government stock as against 0% industrial loan stock and 37% equity. In 1990, government stock"s share was 19.82%, industrial loan stock 19.82% and equity 60.36 % (Uwubanmwen, 2001). While in 1995, government"s share was 12%, industrial loan stock was 22% and equity 66%. By 2005, government stock stood at 8%, industrial loan stock 18% and equity 74%. Only shift in 2010 with government bond/debt security 15%, industrial loan 3% and equity 82% (Figure 2).

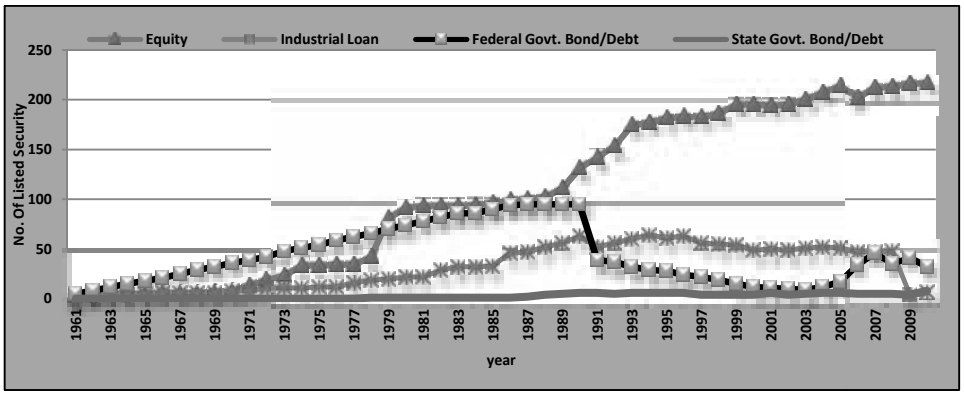

Figure 2. Securities by Category Listed on the Nigerian Stock Exchange (1961-2010)

Source: Author's Analysis

The phenomenal growth of the capital market during the last four decades was brought about by government legislation, monetary policies and technical

advancement in stock operations- privatization policies and exercises (1972,1977,1989-1993, 2001 and likely 2003), recapitalization for banks (2004-2005, electronic processing/automated trading activities, on-line trading, etc. The market capitalization as at 1995 stood at ₦180.31 Billion, ₦472.30 Billion in 2000 and ₦2, 900.10 Billion in 2005. That is an increase of 161.9% and 574.03% respectively but stood at 9918.2 billion in 2010. The number of listed securities listed on the NSE (Fig. 2) has recorded an appreciable increase over the years. On the board of exchange, the number of equities increased from 3 in 1961 to 13 in 1971, an increase of 333.3%. The figure increased to 93 in 1981 an increase of 615.4%. As at 2001 it had increased to 178 an increase of 91.4%. It stood at 214 in 2005 and 217 by 2010. On the second tier securities market (SSM), there was only one security listed as at the time it was introduced in 1985. Ten years later, the number had increased to 20 representing an increase of 1,900%. This was after it had fallen from 23 in 1993. As at year 2005, the figure had fallen again to 16 equities which were maintained to 2010.

3. Review of Literature

In spite of the developments in stock markets, researchers have focused on the relationship between financial intermediaries (especially commercial banks) and economic growth while empirical investigations of the link between capital market and economic growth have been relatively limited.

Atje and Jovanovich (1993) in studying 40 countries for the period 1979-88, and focusing on the dynamics of market size, find a strong positive correlation between the level of financial development and stock market development and economic growth. Levine (1991) and Bencivenga, et al. (1996) emphasize the positive role of liquidity provided by stock exchanges on the size of new real asset investments through common stock financing. Investors are more easily persuaded to invest in common stocks, when there is little doubt on their marketability in stock exchanges. This, in turn, motivates corporations to go to the public when they need more finance to invest in capital goods. Although some contrary opinions do exist regarding the impact of liquidity on the volume of savings, arguing that the desire for a higher level of liquidity works against propensity to save (Bencivenga and Smith, 1991; Japelli and Pagano, 1994), such arguments are not well supported by empirical evidence.

In addition, Levine and Zervos (1998), employed cross section data found that stock market liquidity is positively and significantly correlated with current and future rate of economic growth, even after controlling for economic and political factors. They also discovered that measures of both stock market liquidity and bank development significantly predict future rate of rate of growth. They therefore concluded that stock market provides important but different financial service form

banks. Filer et al (1999) employed Granger causality test to provide evidence of a positive and significant causal relationship going from stock market development to economic growth, particularly for less developed countries. As regards financial variables, they found a positive link between market capitalization ratio and future economic growth although the link is more significant for higher income countries.

Adjasi and Biekpe (2006) study the effect of stock market development on economic growth in 14 countries in a dynamic panel data modeling setting. The results indicate a positive relationship between stock market development and economic growth. According to N'zué (2006), the relationship between the development of the Ivorian stock market and the country's economic performance is positive. The result also reveal that gross domestic product and stock market development are cointegrated when the control variables are included in the analysis. Moreover, there is a unidirectional causality running from stock market development to economic growth.

Carporale, et al. (2005) based on the endogenous growth model study the linkage between stock market, investment and economic growth using Vector Auto Regression (VAR) framework. The overall findings indicate that the causality between stock market components, investment and economic growth is significant and in line with endogenous growth model. It shows also that the level of investment is the channel through which stock markets enhance economic growth in the long-run.

Capasso (2006) using a sample of 24 advanced OECD and some emerging economies shows a strong and positive correlation between stock market development and economic growth and later concludes that stock markets tend to emerge and develop only when economies reach a reasonable size and with high level of capital accumulation. Capasso (2008) uses an optimal capital structure model to provide a link between components of stock market and long-term economic growth. He indicates a strong relationship between stock market and economic growth with firms showing greater preference towards issuing equity than debt as capital continues to accumulate.

Adeniyi (2010) explores the hypothesis that stock market development promotes economic growth in Nigeria and attempts to confirm its validity or otherwise, using quarterly data from 1990:1 to 2009:4 for Nigeria by employing vector error correction model (VECM) technique on the commonly used stock market development indicators. From the result, the model for the total value of shares traded ratio (vr) has the best fit followed by the market capitalization ratio (mcr) model while the model for the turnover ratio (tr) lagged behind. Mishra et al (2010), examines the impact of capital market efficiency on economic growth in India using the time series data on market capitalization, total market turnover and stock price index over the period spanning from the first quarter of 1991 to the first

quarter of 2010. Thus, the authors recommend that market organizations and regulations should be such that large number of domestic as well as foreign investors enters the market with huge listings, investments, and trading so that the very objective of optimal allocation of economic resources for the sustainable growth of the country can be ensured.

Kolapo and Adaramola (2011) examine the impact of the Nigerian capital market on its economic growth applying Johansen co-integration and Granger causality tests, results show that the Nigerian capital market and economic growth are co-integrated. This implies that a long run relationship exists between capital market and economic growth in Nigeria. Chinwuba and Amos (2011), examines the impact of the Nigerian capital market performance on the economic development of Nigeria. The results indicate that Market Capitalization, All-Shares Index and number of listed companies were positively related to and capable of influencing Gross Domestic Product; while the volume of transactions and Market Capitalization were positively related to Gross Fixed Capital Formation. They conclude that the results have proved that the performance of the capital market impacts positively on the economic development of Nigeria. On the other hand, have a very weak negative correlation with economic growth

Ihendinihu and Onwuchekwa (2012) attempted to determine possible causal link between stock market performance and economic growth in Nigeria using time series data for the period 1984 to 2011. The result of the Ordinary Least Square (OLS) technique utilized in analyzing indicate that about 88% and 95% of the changes in economic growth could be explained by changes in stock market performance in the short run and long run respectively. Oke and Adeusi (2012), examines the impact of capital market reforms on the Nigerian economic growth using the ordinary least square method of regression and the Johansen co-integration analysis, the results show that capital market reforms positively impact the economic growth. The study recommends among others that government should objectively evaluate enacted laws and reforms agenda in a manner that will enhance economic growth rather than considering political issues before embarking on reforms.

4. Theoretical Foundation and Methodology

The theory of this study is based on neo-classical growth model drawn from Cobb-Douglas production function to capture the impact of capital market growth on economic g[illegible]

Such that:

[illegible] ……. (1)

Where, Q is output (indicating economic growth), K is capital and L is labour input. Following a Cobb-Douglas production function;

$$Q = K^{\alpha}L^{\beta} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (2)$$

Equation (2) is however, restrictive in the sense that it restricts the factors that influences output to only capital and labor, leaving out other factors that also influence the growth of the economy, for which we introduce the shift factors "A"- to account for technological, reformative and economic shift factors that affect economic growth. Introducing this into the equation by augmenting to labor, we have:

$$Q = K^{\alpha}AL^{\beta} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (3)$$

Taking the log of both sides to linearize the equation, we have:

$$\ln Q = \alpha \ln K + \beta \ln AL \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4)$$

If capital- "K" is dependent on accumulated fund gotten from both the Money Markets (that deal in short term capital mobilization) and Capital Market (that deals majorly in long term capital mobilization), capital investment "K", will therefore be a function of the amount saved in the money markets and/or raised in the capital market. Decomposing "K" we have:

$$K = f(SAV_{mm}, MKC_{cap}) \ldots \ldots \ldots \ldots \ldots \ldots (5)$$

Substituting for K in equation 4:

$$\ln Q = \alpha \ln(SAV_{mm}, MKC_{cap}) + \beta \ln AL \ldots \ldots \ldots \ldots \ldots \ldots (6)$$

Thus, the specified model:

$$\ln GDP = \alpha_0 + \alpha_1 \ln SAV_{mm} + \alpha_2 \ln MKC_{cap} + \beta \ln AL_{gr} + e \ldots \ldots \ldots (7)$$

Equation 7 is the specified model of the study which shows that the growth in output as a function of the savings in the money market, the growth rate in the capital market proxy (by the growth in the market capitalization), and the improvement in the active labor population growth rate. All parameter coefficients are expected to be positive.

In this research work, causal econometric analysis is employed. Data obtained from various (secondary) sources would be tabulated, analyzed and tested. Series of multiple regression analysis with the method of Ordinary Least Square (OLS) is used to establish relationship between variables. In addition, tests for stationary, correlation and variance inflation factor analysis is conducted for a confirmation of the unit root, linear relationships and the absence of multicollinearity respectively to avoid spurious regression.

Data employed for the study are extracted from secondary sources, such as official government documents published by the Central Bank of Nigeria (CBN), Federal Office of Statistics (FOS), the Nigerian Stock Exchange (NSE), Securities and Exchange Commission (SEC) and World Bank Development Indicator.

5. Empirical Analysis

5.1Augmented Dickey Fuller Unit Root Test and Cointegration Test

To avoid obtaining a spurious result by regressing non-stationary series, and also to scrutinize the integrating level of the variables which is to ensure that the variables are not of order I(2), the Augmented Dickey-Fuller (ADF) is employed to test for Stationary and the order of integration of variable. The results of the ADF unit Root test for checking for Stationary of the data, and the determined order of integration is shown in the Table 1

Table 1. Augmented Dickey-Fuller Unit Root Test

Variables	At Level I (0)	At First difference I(1)
LOGMCAP	**0.4578**	**-4.1801*** **
LOGPOP	**0.8180**	**-2.6350***
LOGRGDP	**-0.2365**	**-3.1018****
LOGSAV	**-1.5591**	**-3.8068*** **
Critical Levels:	-3.6793 -2.9678 -2.6230	-3.6700 -2.9763 -2.6274

Note: *, ** and * implies significant at 10%, 5% and 1% significant levels**

*Source***:** *Author's Computation*

The table above shows that all the variables are stationary at first difference. Hence, we conclude that the variables are stationary and the model is specified and regressed at first difference. However, following the rule of thumb as put by Gujarati (2003); that spuriousity in regressed result, is observed when the goodness of fit measure – "R-Square (R^2)" is greater than the autocorrelation indicator - "Durbin-Watson (DW)". That is, if R^2> DW, we have a spurious regression and the result is not reliable. But if the DW > R^2, then we have a non-spurious regression whose report is reliable for forecasting and policy making, Thus, considering the regression at level may still be considered with the regression technique to be employed, dependent on whether or not a cointegrating relationship exist among the variables, after which diagnostic-post test for multicollinearity and auto-serial correlation (Durbin Watson) are considered.

From the Augmented Dickey Fuller (ADF) test, all the variables are stationary at first difference; we therefore go further to test for any cointegrating relationship among the variables, as this would likely suggest the regression technique to be employed.

Table 2. Johansen Cointegration Test

Hypothesized No. of CE(s)	**Eigen value**	**Max-Eigen value**	**Critical value 0.05**	**Trace statistic**	**Critical value 0.05**
None	0.444398	16.45570	27.58434	38.68548	47.85613
At most 1	0.330704	11.24281	21.13162	22.22977	29.79707
At most 2	0.290500	9.609437	14.26460	10.98696	15.49471
At most 3	0.048007	1.377521	3.841466	1.377521	3.841466

Source: Author's Computation

**** denotes rejection of the hypothesis at the 5% level***

The Johansen cointegration test presented in Table 2 above, shows that there exist no cointegrating relationship among all four variables at 5 percent critical levels. This conclusion of no cointegrating relationship among the variables is confirmed in both the Trace test and the Maximum Eigen value test as expressed in the table. For this reason, we therefore conduct the regression using the basic Ordinary Least Square regression for a multivariate model.

Table 3. Estimates of the Static Model

Dependent Variable: LOGRGDP				
Method: Least Squares				
Sample: 1981 2010				
Included observations: 30				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LOGSAV	0.54241	0.183689	5.565274	0.0001***
LOGPOP	0.46146	0.406451	1.133539	0.2666
LOGMCAP	0.38241	0.016116	3.724047	0.0030***
C	0.24609	2.870419	0.130897	0.8057
Where: *, ** and * implies significant levels at 1%, 5% and 10% respectively R-square ≈ 0.761, Adjusted R-square ≈ 0.615, F- statistics ≈ 212.3, Durbin-Watson stat. ≈ 1.463, Prob (F-statistic) ≈ 0.00**				

Source: Author's Computation

The result in table 3 shows that market capitalization does have a significant positive effect on the growth of the economy. Significant at 1%, the result shows that a 1 percent increase in the growth of the capital market measured by its market capitalization, will lead to a 38% increase in growth. This conforms to the finding of earlier empirical results such as Capasso (2006) for 24 OECD countries, Mishra et al (2010) for India, and Chinwuba and Amos (2011), Kolapo and Adaramola (2011), Oke and Adeusi (2012) for Nigeria, amongst many that all agree that the capital market is an essential catalyst for economic growth and development against the views of Wai and Patrick (1973), De' Long et al (1990), Jappeli and Pagano (1990), Killick and Martin (1990), and Morck et al (1990) that suggest otherwise. The commercial bank savings was found to have a similar effect on economic growth, though with a marginally higher percentage effect on the economic growth. From the result, a percentage increase in the savings rate, will lead to 52% increase in the growth of the economy. Given its slightly larger effect on the economic growth, the result implies that growth in the Nigerian economy is bank /money market based than capital market based. That is the Nigerian economy seems to source more of its investment capital (capital structure) from the banks than the capital market.

From the result, the growth in labor population was found to have a positive (0.46) but insignificant impact on economic growth. This suggests that the labor input of the working population of the country is yet to have a significant contribution on the economic growth of Nigeria. In addition, the F-statics value (212.3) which confirms the joint significant of the included independent variables to influencing economic growth, as the critical significance value on the joint probability is less than 0.05.The result shows that approximately 70 percent of the variation in the economic growth is a result of the included independent variables. This is indicated by the R-square, while the remaining 30 percent are caused by other factors. The Durbin Watson (D.W) statistics of 1.46is below the traditional benchmark of 2.0 in the model, the study can conclude that there is no of sign auto- correlation or serial correlation in the model specification; hence the assumption of linearity is not violated. Also, the Durbin Watson value is greater than the estimated R-square. So following Gujarati"s (2003) rule of thumb, the result is not spurious.

6. Conclusion

This study has examined the development of capital market and its impact on the economic growth in Nigeria. The empirical findings from the research work suggest that the capital market contributed positively and significantly to growth of Nigerian economy along with the developments in the banks from 1981 to 2010. All in all, growth of the capital market is on the average and beneficial to the economy, the high cost of raising capital and structural imbalances in the market as

well as inconsistent government policies may distorts the speedy growth of the market and thus, limiting its positive impact on the economy. Based on the findings and conclusion drawn on this study, the following recommendations are therefore proposed:

- Regulatory authorities of the market, should initiate policies that would encourage more companies to access the market such as a downward review of lending rates, relaxation of entry requirement for companies, etc; as the number of listed securities as found in the study indicates the potency of this factor to produce positive impact and the high lending rate that increases financing constraint.
- Market organization and regulation should be such that large number of domestic as well as foreign investors enters the market with huge listings, investments, and trading. So that the very objective of optimal allocation of economic resources for the sustainable growth of the country can be achieved.
- Also, the authority needs to be more proactive in their surveillance role in order to check sharp practices which undermine market integrity, investors" returns and erode investors' confidence.
- Finally, government should ensure an investment friendly environment, by putting in place the necessary social infrastructures, services, and policy reforms that will enhance and encourage its labor force, domestic and foreign investor, the functioning of its financial markets, and economic growth.

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The Trend of International Risk Diversification

Oana Mionel[1], Alexandra Moraru[2]

Abstract: The goal of this paper is to analyze the international diversification of risk through portfolio diversification based on investments abroad, particularly by investing in currencies of emerging countries. The starting point of the analysis is the work of Harry Markowitz, *Portfolio selection*, a reference work for the global financial environment in which the author states that a portfolio is efficient if it provides the highest possible expected return for a given level of risk and the lowest possible level of risk for any expected rate of earnings. The information used for this study comes from numerous sources and of great importance to international financial markets. The results based on the used data and information provide a comprehensive scan of how Federal Reserve proposed a clustered index of currencies, the current trend of exchange, the emerging BRIC countries scenario for 2050 and sources of the volatile emerging markets. Thus, following the completion of this work, we consider it necessary to pay attention to the course of emerging markets whose economic development and openness plays a significant role in their penetration of international investors' investment plan.

Keywords: portfolio diversification; emerging countries; emerging currencies

JEL Classification: G11; G15

1. Introduction

Investors are always looking for new effective ways of diversifying its portfolio. Alongside derivative contracts, another means to control portfolio risk is diversification through investments made in a wide variety of national and international activities so that exposure to any type of risk is limited. Thus, paraphrasing James Tobin, by placing "eggs" in several baskets, overall portfolio risk may be lower than the risk of each asset individually analyzed (Boidie, Kane, Marcus, 2003, p. 162). In *Twenty Years of International Equity Investing* (1996), Richard Michaud, Gary Bergstrom, Ronald Frashure and Brian Wolahan present portfolio diversification as a concept now accepted by all investors from around the world. However, in 1975, when the concept was proposed by Gary Bergstrom in

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the *Journal of Portfolio Management*, portfolio diversification was a new term and regarded as unusually risky. Since 1975 and until now many economists and financiers have written about reducing risk and increasing efficiency through portfolio diversification in different international capital markets, the current global environment increasingly creating stronger reasons for rising diversification of investment portfolio outside home countries, and we refer particularly to foreign portfolio diversification.

2. Portfolio Theory: the Impact on Investors

Arguments for global diversification of the portfolio are focused on reducing portfolio risk and increasing the expected return of the portfolio. The core argument is Harry Markowitz's work on portfolio efficiency, *Portfolio Selection* (1952). A prudent investor is focused on portfolio expected return and the risk involved. The expected return on a portfolio of n assets is a weighted average expected return for each asset: $E(r_p)=\sum_{i=1}^{n} w_i E(r_i)$, where $E(r_p)$ is the portfolio expected return, $E(r_i)$ represents the expected benefit on asset i from the portfolio, n designates the number of assets in the portfolio, and w_i indicates assets i weight in the portfolio, and the relation $\sum_{i=1}^{n} w_i = 1$ is always true. The widely used measure for the portfolio risk is *dispersion*. Portfolio risk measured by dispersion is given by the following formula: $\sigma^2(r_p)=\sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \operatorname{cov}(r_i, r_j)$, where $\sigma^2(r_p)$ is portfolio dispersion (the risk), w_i is asset i weight in the portfolio, w_j is asset j weight in the portfolio, $\operatorname{cov}(r_i, r_j)$ is the covariance between assets i and j benefits, and n is the number of assets in the portfolio.

Portfolio dispersion depends on the dispersion of each asset and the correlations between assets. The first instrument that measures the relationship between the benefits of any two assets is *covariance*. If we have two random variables X and Y, they can have n possible outcomes combined. When event e takes place, X value is r_{xi} and Y value is r_{yi}. By marking $E(r_x)$ the expected benefit of X and $E(r_y)$ the expected benefit of Y and supposing that p in the probability of the event taking place, the covariance is determined as follows: $\operatorname{cov}(r_x, r_y)=\sum_{i=1}^{n}[r_{xi}-E(r_x)][r_{yi}-E(r_y)]p_i$ (Horobeț, 2005, p. 18).

Harry Markowitz considers a portfolio to be effective if it provides: a) the highest possible expected return for a given level of risk, b) the lowest possible level of risk for any expected rate of earnings. The curve describing all efficient portfolios is called the *efficient frontier* by Markowitz. By definition, all portfolios are under or on efficiency frontier. Suppose a portfolio manager invests only in domestic assets. In this case, the domestic efficiency frontier portfolios reflect the best kit available. In Figure 1, the portfolio has the maximum expected return for a given level of risk. If we analyze the global portfolio manager, the situation changes. Usually, a global investor invests in ten, twenty or even more countries. In this case, global portfolio may include both high-risk and low-risk assets and expected returns higher than those offered by domestic portfolio. Also in Figure 1 is the efficient overall portfolio B, which will have a much lower risk for the same level of expected return for the portfolio A. There is also portfolio C, which will have a much higher expected return for the same level of risk as portfolio A (Michaud & Bergstrom & Frashure & Wolahan, 1996, p. 9-22).Markowitz's theory is currently considered the standard theory of investment management and rational ideas expressed on that investment expansion beyond country offers major opportunities to investors. Therefore, the creation of an investment policy based both on domestic assets and foreign assets is currently on arguably more important than investment based solely on domestic assets. The situation began to unfold with the passage from fixed exchange rates to floating ones, and with the globalization of financial markets which has demonstrated that markets are interconnected.

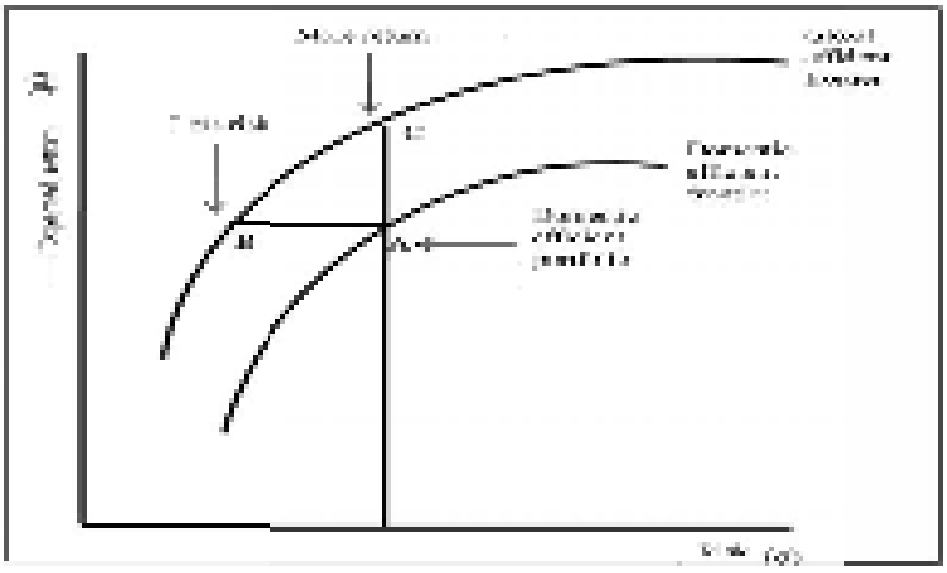

Figure 1. Global Efficiency Frontier vs. Domestic Efficiency Frontier

Source: (Michaud, Bergstrom, Frashure & Wolahan, 1996, p. 10)

The overall risk of a portfolio can be divided into two types of risk: *systematic risk* and *unsystematic risk*. Professor William Sharpe defines systematic risk as an asset earnings variability driven by common factors that affect all assets in the market gains. Sometimes this type of risk is called *undiversified risk* or *market risk*. Systematic risk is considered the minimal risk level that can be achieved through diversification of a portfolio with a large number of random assets. Unsystematic risk is defined as earnings variability if an asset due to unique factors (strikes, natural disasters, loss of a dispute) related directly to the company that issued the title. This type of risk is known as *diversified risk, unique risk, idiosyncratic risk* and *company specific risk* (Sharpe, 1963, pp. 277-293).

3. Portfolio Diversification with Emergent Currencies

3.1. The Federal Reserve Currency Classification

An important classification of currencies with which investors can diversify their portfolios was conducted in late 1998, when the Federal Reserve introduced a new index (different from the one used until 1970). For the USA the change was based on two reasons. The first reason was that five of the ten currencies making up the index have been replaced by the single currency euro, and the second was aimed at developing international trade since the late 70s, which requested an extension of the Index and a close proximity between partner countries' currencies and U.S. dollar. Aggregate index of exchange aims to summarize the effects of appreciation and depreciation of the dollar against major currencies competing American products with the products of the largest trading partners of the United States. It also aims to move the dollar index against the major currencies for financial markets to avoid pressure on the dollar. Federal Reserve leadership has set the following formula for the index: $I_t = I_{t-1} \times \prod_{j=1}^{N(t)} (e_{j,t} / e_{j,t-1})^{w_{j,t}}$, where I_{t-1} is the index value at the time *t-1*; $e_{j,t}$ and $e_{j,t-1}$ is the price of the dollar in the currency terms at the time *t* and *t-1;* $w_{j,t}$ is the importance of the currency *j* in the index at the time *t*; *N(t)* is the number of currencies in the index at the time *t* and $\sum_j w_{j,t} = 1$. Federal Reserve has grouped the currencies which were part of the general Index into two classes: The Major Currencies Index and Other Important Trading Partners – the OITP countries are China, Mexico, Korea, Taiwan, Hong Kong, Malaysia, Brazil, Thailand, India, the Philippines, Israel, Indonesia, Russia, Saudi Arabia, Chile, Argentina, Colombia, Venezuela).

Besides the 1998 proposal of the Federal Reserve to classify currencies as major and minor currencies, Howard Simons suggested in 2008 in his work *Currencies*

and U.S. a research framework of 52 currencies divided into six groups for the investors on the equity market: Europe – major currencies, Europe – minor currencies, Latin America, Asia – minor currencies, Asia – major currencies, Africa-Middle East, and others (Simons, 2008, p. 26-31).

MSCI Barra, the American provider that offers support for investment decisions, proposes *MSCI Global Currencies Indices* for the analysis of the global equity market.

MSCI Global Currencies Indices may be used as support instruments for the managing the currency flow following the creation of an international portfolio. These indices set the level of importance for each currency according to the importance of the country they belong to. This approach of weighing the currency allows the creators of indexed products to accomplish investment methods to be used efficiently in the practice of protecting against currency risk. The global currency indices may be calculated both for the developed countries (*MSCI Developed Countries Index: MSCI EAFE Currency [USD] Index* and *MSCI Europe Currency [USD] Index)*, and for the emergent countries (*MSCI Emerging Market Index*).

Table 1. Major Currencies vs. Minor Currencies

Europe (major currencies)	**Asia (minor currencies)**
CHF – the Swiss Franc	CNY - the Chinese Yuan
DKK – the Danish Crown	HKD – the Hong Kong Dollar
EUR – the Euro	IDR – the Indonesian Rupee
GBP – the Pound Sterling	INR – the Indian Rupee
NOK – the Norwegian Crown	KRW – the Korean Won
SEK – the Swedish Crown	LKR – the Sri Lanka Rupee
Europe (minor currencies)	MYR –the Malaysian Ringgit
CZK – the Czech Crown	PHP –Philippine Peso
HRK – the Croatian Crown	SGD – Singapore Dollar
HUF – the Hungarian Forint	THB – the Thai Baht
ISK – the Icelandic Crown	TWD – the Taiwan Dollar
PLN – the Polish Zloty	**Africa – Middle East**
RON – the Romanian Leu	CYP – Cyprus Pound
RUB – the Russian Rouble	EGP – the Egyptian Pound
SKK – the Slovakian Crown	ILS – the Israeli Shekel
Latin America	IRR – the Iranian Rial
ARS – the Argentinean Peso	KES – the Kenyan Shilling
BRL – the Brazilian Real	LBP – the Lebanese Pound
CLP –the Chilean Peso	MAD – the Moroccan Dirham
COP –the Columbian Peso	MUR – the Mauritian Rupee
CRC – the Costa Rican Colonel	NGN – the Nigerian Naira
MXN –the Mexican Peso	PKR – the Pakistani Rupee
PEN – Nuevo Sol (Peru)	SAR – the Saudi Arabia Riyal

PYG –the Paraguayan Guaraní	TND – the Tunisian Dinar
Asia (major currencies)	TRY – the Turkish Lira
AUD –the Australian Dollar	ZAR – the South African Rand
JPY –the Japanese Yen	**Others**
NZD – New Zeeland Dollar	CAD – the Canadian Dollar

Source: Howard Simons, 2008.

3.2. The Emergent Currencies' Trend in the New Age of Globalization

With globalization, national currencies are considered by Eric van Wincoop and Andrew Rose (2001) as international trade barriers whose removal would lead to significant economic benefits. In addition, going on the idea that financial markets have become more important than national governments globalization forces governments to adopt strong currencies and to abandon their own currencies. In such an environment, Alan Taylor stated in an economic letter addressed to the Federal Reserve Bank of San Francisco in 2000 and entitled *Dollarization as a Technology Import* that only the highest quality coins will be able to survive. In this regard, it is interesting to remark Paul Bowles's statement in his book *National Currencies and Globalization: Endangered species?*: Globalization as global financialization is dictating this effect (Bowles, 2008, p. 1).

Along with the trend, especially the *dollarization* and *euroisation* of global investors' portfolio, globalization has brought into question the tendency to invest in emerging currencies. Currently, the *dollarization* and *euroisation* is the imperialist structure - the present structure of globalization. This is about the *dollar hegemony* acting as a symbol of imperialist ambitions of the United States of America. Therefore, to Robert Wade the dollar's role in the global economy is *part of the invisible hand of the American empire*. By contrast, the "birth" of the euro is an event of epochal significance, a significance which indicates a regional manifestation rather than a global one. For example, for Zanny Minton Beddoes - Washington economic correspondent for The Economist - the euro is the future for investors who wish to invest in this currency (Beddoes, 1999). Instead, globalization skeptics do not see any major change in the appearance of euro, only a neoliberal ideology that seeks the removal of monetary autonomy and independent currencies.

The expressions *emerging markets* or *emerging economies* are vaguely defined in the literature. The World Bank defines emerging markets as "places" in which GDP per capita records the amount of approximately $ 8,000 / year, but they have a dynamic development potential and they are fast-growing economies (Luo, 2002, p. 4). Portfolio diversification opportunities offered by emerging markets is a relatively recent phenomenon, associated with the early '90s, which developed as the capital markets have deepened and broadened. Essential arguments supporting

the role of emerging markets in the portfolio of an investor from a developed market are two in number. The first argument supports emerging countries, which even if considered small countries with limited capital, offer investors high returns compared to what mature countries offer. The second argument provides a positive outlook for emerging markets in that emerging markets yields are very poorly correlated with yields in developed markets, which creates benefits for diversification. These effects may operate in tandem, giving investors - as stated by Robert Litan and Martin Baily - a "free lunch" with high returns and low risk. Currently, due to long periods of crisis of the financial markets in recent years, many emerging countries increasingly promote more financial stability as a key part of their economic policies. Thus, it is suggested that possible regulatory changes will affect a growing number of currencies. Emerging markets will continue to drive global growth in coming years. These markets will become important centers for investment, developing new products and currency regulation (HSBC Global Research, 2012, p. 1).

3.3. The BRIC Countries Time Scenario for 2050 Time Horizon

Development and globalization - and we refer here specifically to the economic situation of emerging countries - are two of the most heated and debated issues worldwide, especially by investors with long-term perspectives. Analyses of the BRIC countries are very important, and projections are optimistic, especially since it is expected that they will become a force in the global economy, a force far greater than investors currently expect.

On this subject, in 2003, researchers have developed the work *Dreaming with BRICs: The Path to 2050*, at Goldman Sachs, a study on the future of the BRIC countries over the next 50 years. Researchers analyzed the parallel evolution of the G6 countries (Australia, Brazil, India, Japan, EU, USA) and the evolution of the BRIC countries, taking into account the latest data on demography, the model of capital accumulation, the GDP, the income per capita and the movement of currencies in the BRIC economies in 2050. Moreover, Goldman Sachs said that an increase in the exchange rate could contribute significantly to the GDP growth in U.S. dollars for BRIC countries: one third of this increase is attributable to the appreciation of the BRIC countries' currencies and the other 2/3 will come from the rapid growth of economies.

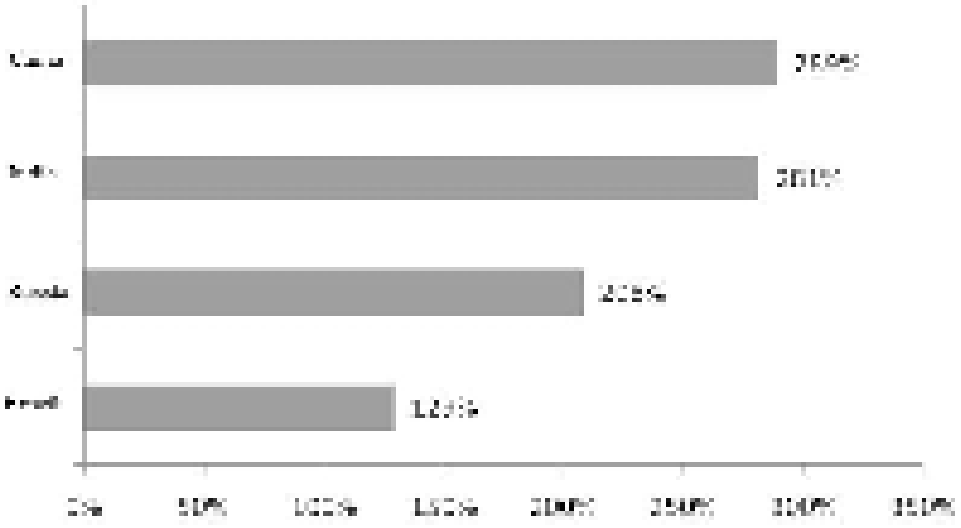

Figure 2. Forecasts for the Exchange Rate in 2050

Source: Goldman Sachs, 2003

The real exchange rate of the BRIC countries could appreciate by 300% over the next 50 years and China's currency could double the value if it continues to grow and the exchange rate is allowed to fluctuate further (Goldman Sachs, 2003, p. 5). BRIC countries' development model seems to be based on different determinants. If for Brazil and Russia the determinants may be their natural resources, for India, it is about testing its own version of economic development where outsourcing is a strong component. This new dimension of growth achieved more by services than by production activities, made possible the development of the Internet, thus reducing communication costs.

3.4. The Sources of Volatile Emerging Markets

Currently the most important emerging economies are the E7 countries: China, India, Brazil, Russia, Indonesia, Mexico and Turkey. As emerging markets, these countries tend to experience rapid growth and their currencies may present major opportunities for portfolio diversification rates. In the article *The behaviour of emerging market return*, Geert Bekaert, Claude Erb, Campbell Harvey, Tadas Viskanta said that the behavior yields of emerging markets is different from the behavior yields in developed markets. Research on emerging markets highlighted three basic characteristics for the behavior of these markets: high average returns, high volatility and low correlations between emerging markets and developed markets (Levich, 1998, p. 108).

The sources of volatile emerging markets can be found at both international and national levels. The main international sources of volatility are changes that occur in the return on assets (interest rates and stock market returns), herd behavior of investors and contagion. There is evidence to suggest that emerging markets are inclined to foreign investors with a herd behavior, but there are analyses of these countries that began the process of financial integration 20 years ago and it suggests that this behavior suggests has a "short life". Regarding the effect of contagion, the experience of countries that have followed the Mexican crisis suggest that *pure contagion* is a relatively short phenomenon and international markets are able to take each emerging market separately. These differences have helped countries with strong economic fundamentals to resume financial flows quite rapidly.

Regarding national sources of volatility, emerging countries are more susceptible to real and political shocks than developed countries, and these shocks will result in higher volatility of capital flows and asset prices. In addition, there are several other features that can enhance the emerging international and domestic shocks. Financial and capital markets in emerging countries suffer more because of incomplete and asymmetric information than developed countries. In this environment, the potential for investors' herd behavior is very high and domestic investors can be greatly influenced by foreign investors, which may lead to greater volatility. From this point of view, emerging markets after the crises of the 90s were a time "marginalized" in the international portfolio investors, making them even more susceptible to fluctuations in international financial conditions (World Bank, 1997, p. 27-28).

Table 2. Emerging Countries with the Best and the Worst Performance during 1988 - 2008

Year	Country with the best performance	Return	Country with the worst performance	Return	Spread
1988	Indonesia	228%	Turkey	-63%	291%
1989	Turkey	472%	South Korea	0%	471%
1990	Mexico	59%	Brazil	-66%	124%
1991	Argentina	402%	Indonesia	-46%	448%
1992	The Philippines	37%	Turkey	-50%	87%
1993	Poland	745%	Israel	14%	731%
1994	Brazil	64%	Poland	-55%	119%
1995	Peru	22%	Pakistan	-38%	60%
1996	Russia	151%	South Korea	-38%	189%
1997	Russia	112%	Indonesia	-75%	186%
1998	Korea	138%	Russia	-83%	221%
1999	Russia	246%	Columbia	-19%	265%
2000	Israel	25%	Indonesia	-63%	88%

2001	Russia	53%	Egypt	-44%	97%
2002	Pakistan	151%	Argentina	-52%	201%
2003	Thailand	144%	Malaysia	27%	117%
2004	Columbia	132%	Thailand	-1%	134%
2005	Egypt	162%	Malaysia	2%	159%
2006	China	83%	Turkey	-7%	90%
2007	Peru	94%	Argentina	-4%	98%
2008	Morocco	-11%	Pakistan	-74%	63%

Source: Austin Fraser, 2010

Despite these similarities, emerging markets are very different economically, politically and socially. Performance on each market is different from one year to another, and the evolution of these markets is very important for investors wishing to diversify their portfolio by investing in these markets (Fraser, 2010, p. 131).

In conclusion, regardless of the degree of similarity or discrepancy that exists between emerging countries, the data from the last twenty years shows that economic development and open markets play a significant role in the development and penetration of these markets in terms of investment of international investors. As long-term growth restores the importance of countries worldwide, rapid and unsustainable economic expansion can cause major macroeconomic imbalances and serious economic crisis as it was seen in the 90s. In this context, *The MSCI Emerging Market Index* for investors in the foreign exchange market is to provide important information in case they want to diversify their portfolio by investing in emerging market currencies.

Table 3. MSCI Emerging Market Index for Latin America

Latin America	22,5%
The Brazilian Peso	15,1%
The Mexican Peso	4,3%
The Chilean Peso	1,4%
The Peruvian Peso	0,6%
The Argentinean Peso	0,5%
The Colombian Peso	0,6%

Source: www.mscibarra.com

Table 4. MSCI Emerging Market Index for Africa and the Middle East

Middle East			21,5%
The Russian Rouble	6,9%	The Hungarian Forint	0,5%
The South African Rand	7,3%	The Egyptian Pound	0,6%
The Israeli Shekel	2,9%	The Czech Crown	0,5%
The Turkish Lira	1,3%	The Moroccan Dirham	0,4%
The Polish Zloty	1,0%	The Jordanian Dinar	0,1%

Source: www.mscibarra.com

Table 5. MSCI Emerging Market Index for Asia

Asia					59,6%
The Chinese Renminbi	18,4%	The Indonesian Rupee	8,2%	The Thai Baht	1,2%
The Korean Won	14,4%	The Malaysian Ringgit	2,8%	The Philippine Peso	0,4%
The Thai Dollar	12,5%	The Indonesian Rupiah	1,5%	The Pakistani Rupee	0,2%

Source: www.mscibarra.com

4. Conclusions

Along with the main currencies in the foreign exchange market that exists in investors' portfolio, diversifying risk prompted investors to expand their portfolio by investing in emerging market currencies. The importance of emerging markets for investors is supported by the fact that, although considered small countries with limited capital, they offer international investors high returns compared to what mature countries have to offer, because yields in emerging markets are very poorly correlated with those on developed markets. Therefore, one can say that emerging markets offer international investors a "free lunch" with high returns and low risk. In the authors' opinion, even if, following the crises of the '90s, emerging markets have been "marginalized" for some time in the international investors portfolio, the present data and future scenarios designed especially for the BRIC countries show that the economic opening of these markets as well as their development plays a significant role in their penetration of international investors investment plan.

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Dynamics of Air Passenger Transportation in Eastern Romania

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Abstract: The concept of an air route mile is, of course, entirely different from that of a road or rail route mile. An air route is a direct service between two cities. The too-rapid development of the air route system must inevitably result in an average intensity of operations on the route, and this means the frequencies are low or high, or the airplanes used are profitable or unprofitable. The purpose of this paper is to emphasize air passenger dynamics in Romania and to calculate specific indicators regarding this calculation for the airports in eastern Romania in 2011t., this, because the air passenger featurea indicator passenger – kilometer, starting with 2009 no longer calculate for aviation and shipping.

Keywords: lower airspace; upper airspace; flight level; traffic on airports in Romania; passenger air traffic

JEL Classification: L93; R12

1. Airways in Romania

Romania, by its geographical position, by its traditions and its open policy of good neighbourliness, having an area of over 237.5 thousand square miles and about 23 million inhabitants, is, de facto, part of the European countries' family and it has irreversibly started the integration in the European and Euro-Atlantic structures.

Situated on the transit passage between Western Europe and the Middle East, being in itself a regional force, Romania, once it became independent in the second half of the XIXth century, has started to develop the means of transportation by investing resources, talent and hard work in creating infrastructure of the highest technological level at the time (Fistung, 2007)

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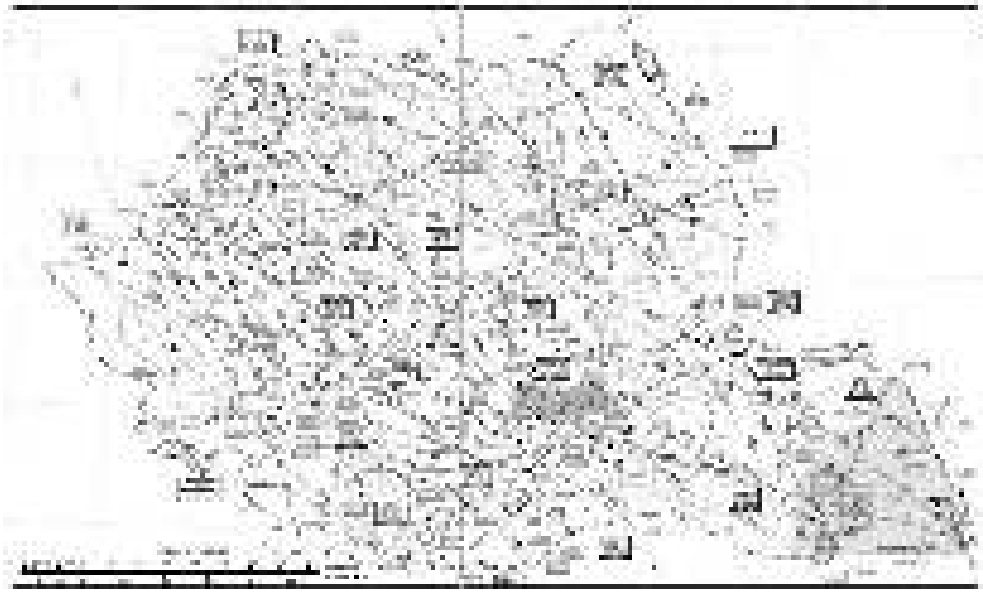
The potential offered by its natural resources – bordering on the Black Sea and being crossed on a distance of 1.075 km by the Danube River, the most important waterway in Europe – has provided Romania a favorable strategic position in the confluence area of transport-generating poles in Europe, Balcans and the Middle East. By developing land transport infrastructure, Romania has become a connecting point between the Baltic and northern countries and the geographical area of countries bordering on the Black Sea. (Muscalu, 2006)

Changes in former Iugoslavia and former USSR have created a complete reorganization of the traditional transport pattern in the area and have also led to capitalizing on Romania's transport infrastructure and it's favorable geographical position. Romania possesses an infrastructure network (roads, railways, waterways, navigable canals, sea and river ports, airports, airways) which connects all places with the national transport network and with the international transport systems.Concentrating economical activity in relatively small areas means that travel time is short for the Romanian air transportation. There are 3 categories of airways in Romania (see map 1)



Map 1. Airways in Romania

Source: Information provided by the Romanian Civilian Aeronautic Authority (www.caa.ro/navigatie-aeriana)

- Airways for flights towards east (green)
- Airways for flights towards west (blue)

- Airways for bidirectional flights (red)

All these airways can be found on maps for lower[1] and upper airspace flights on both internal airways (10 km wide) and international airways (20 km wide).

2. Method of Analysis

The following research reports on air traffic[2] flow for passengers in the south-east and north-east of Romania from the 28th of March 2011 to the 23rd of October 2011. Traffic flow can be accurately described (due to the lack of statistics) only in connection with the origin and the destination of passengers using air services in this area.

The analysis of the total available seat miles[3] on the eastern routes of Romania has been carried out by studying timetables published by the airlines operating on airports in the developing areas in eastern Romania (Bacău, Iaşi, Suceava, Mihail Kogălniceanu and Tulcea).

This represents the best method of describing passengers' air traffic flow, since:

- first, it is impossible to estimate correctly, from a statistical point of view, the number of available seats on internal or international service sectors operated by Romanian or foreign airlines;
- second, round-trip traffic at peak times is to be considered;
- third, the connection between the places operated and the traffic flow depends entirely on the price the tickets are sold for and this varies considerably depending on the route. (Wheatcroft, 1954) Therefore, an analysis of passenger transport capacity of airlines based on published timetables will provide a useful description of air traffic pattern in eastern Romania.

[1] lower airspace (lower space) and upper airspace (top space) are separated from flight level(FL) 285.The upper is between FL 285 and FL 660, and the lower is between standard height of 900m and FL 285. A Flight Level (FL) is a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the International standard pressure datum of 1013.25 hPa (29.92 inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

[2] according to flight schedule displays at airports that have sat in the study.

[3] passenger capacity derived by multiplying the number of available seats flying mileage.

3. The Route Pattern

The extent of transport routes in Romania used for this research includes the length of transport ways according to their type and taking into account data in the statistical database in 2010 and data provided by the Romanian Aeronautic Authority.

Offering other means of transportation, others than air transport, is rather connected to the area than to the number of population and railway, road or naval networks. (Fistung 2007) We can also notice from the calculation that the total number of these ways of transport is over six times bigger. In (table 1) there are the compared numbers of transport routes in Romania according to the two developing areas in the east side.

Table 1. Length of transport routes in Romania and in the developing areas

	România	North-eastern area	South-eastern area
Population	21504442	3.836.875	2.932.124
Area	238 391 km²	30.949 km²	35.770 km²
Road transport route length (km)	81693	24648	10966
Density on 100 km²	34,3	33,7	30,7
Railway transport route length (km)	10785	1619	1749
Internal river route length (km)	1.731	-	170
Total	94209	26267	12885
Airway route length (km)		14315	3717
Total		108524	42869
Airports (number)	17	3	2

Source: Processed by author according to the information provided by Romania's statistical database in 2010 and the Romanian Civilian Aeronautic Authority.

We can notice that the density of the routes in the east part of Romania compared to the same indicator at global level does not show significant differences. In regard to this conclusion we are able to analyze in this research whether passenger air traffic will compete with the other two means of transportation - road and railway- on both short and medium distances.

In (table 2), we can see the number of seats made available by the airlines operating in eastern Romania before and after joining the EU, that is in 2011 and 2006.

Table 2. Length of air transport routes in eastern developing areas from the 28th of March 2011 to the 23rd of October 2011 and the same period in 2006

2011							
Statistical data / Areas	Airports	Length of airways (km)			Weekly available seats		
		Airways towards east	Airways towards west	Bidirectional airways	One way	Return	Round trip
North-East	Bacău	734	1300	1683	500	500	2432
	Iași				708	640	550
	Suceava				500	500	600
South-East	Mihail Kogălniceanu				1044	1044	2146
	Tulcea				Only charter flights		
2006							
Statistical data / Areas	Airports	Length of airways (km)			Weekly available seats		
		Airways towards east	Airways towards west	Bidirectional airways	One way	Return	Round trip
North-East	Bacău	734	1300	1683	302	302	662
	Iași				412	380	250
	Suceava				120	120	250
South-East	Mihail Kogălniceanu				480	480	884
	Tulcea				52	52	-

Source: processed by author according to timetables of airlines operating on airports in the east of Romania and data provided by the Romanian Civilian Aeronautic Authority

Comparing the number of seats available for the eastern part of Romania between the two periods, that is between joining the EU and after that time, we can't help but noticing a process of growth. The explanation is the number of aircraft which served these areas – once Romania has joined the EU, air travel on the Union's territory has undergone some changes, offering consumers multiple choices. Open - skies deregulation has introduced competition on routes which used to be well-protected by the national airlines.

Airlines, stimulated by competition, offer products and services that are competitive in regard to quality and price (M. Muscalu 2007). If before joining the EU there were only national airlines, nowadays there are also a number of well-known airlines, both national (Malev, Austrian Airlines) and low cost (Air Berlin).

The spread of air routes in Romania is not based on the number of cities serviced, but on the fact that airlines wished to offer direct flights between as many cities as possible, internally as well as internationally, due to the massive shift of work force towards countries such as Italy, Spain or UK.
Analyzing (table 2) we can draw the conclusion that:

- The only important routes towards the eastern part of Romania are those servicing Mihail Kogălniceanu Airport if we take into consideration the weekly capacity of passenger transportation. This sector is unique in Romania thanks to the number of airlines operating there since beaches along the Black Sea coast are attractive in the summer.

- The other routes servicing the airports in the north-east appeal either to tourists or people working in other countries (this area has a high rate of unemployment).

- Tulcea Airport is a destination towards the Danube Delta and it is serviced only by charter flights

In (table 3) two reference indicators for air transport are calculated - these are seats/kilometer and seats-kilometers. This calculation is made on the basis of the timetable of each airline operating on an airport in eastern Romania and the type of aircraft provided.

Table 3. Seats/kilometer and seats - kilometers in eastern developing areas from the 28th of March 2011 to the 23rd of October 2011 (weekly research)

Statistical data / Areas	Seats/kilometer			Seats-kilometer (ASK)		
	Airways towards east	Airways towards west	Bidirectional airways	Airways towards east	Airways towards west	Bidirectional airways
East Romania	3,65	2,06	3,40	1970056	3489200	9640224
	Average 3,03 seats/kilometer			Average 5033160 seats - kilometers		

*For Air France in Europe in May 2009 the index was 992.000.000 Available seat-kilometers (*ASK*), weekly (www.airfranceklm-finance.com/financial-publications)
* For Air Berlin in Europe in May 2009 the index was 938.148.148 Available seat-kilometers (*ASK*), weekly (http://www.airberlin-09.sw-gb.de.)

Source: Processed by the main author

If we analyze the data used in (table 3), we can make the following assumptions:

- Traffic in Romania and the eastern airports is relatively low compared to the average European traffic;

- An aircraft profitability must be based on efficacy in passenger transportation on short distances and this depends on the ability to operate while having all seats booked;

- Romanian traffic is influenced by seasonal variation and this aspect adds significance to passenger transportation according to the number of passengers;

- After 2007, when the European Union was extended, air network over–extended in Romania, and this may be a primary cause of some of the economic problems of the airlines in the eastern region of Romania, such as: the deregulation of air space, which means there are more air transport companies LCC (low cost companies) which operate, or the frequency which is very important to business passengers because the speed advantage in air transport is of interest to them only if there are services available to get them to their destination.

3. Conclusion

The conclusion of route pattern calculation is that there is a tendency of making airways more crowded especially for medium courier flights, which doubles the available seats. (round trip) Short courier flights are in competition with the road and railway transport because the number of available seats has not very much increased (One way and Return).
Another conclusion refering to this has inevitable results in the average of flight density, which is relatively low. As a consequence, either the system of the other routes attracts the population willing to travel, or the aircraft used do not have the best economical profitability.
Today, air traffic may be affected by seasonal or random phenomena disturbing as form:

- The economic recession wich has greatly affected the air transport sector
- The effects of the pandemic influenza

Being wisely used, Europe's transport system is modernized and transformed in a trans-european transport network which links various means of transport. Therefore, passengers can travel and goods can be easily carried on long distances by air, sea, land and railway on different sections of their trip, and they are easily moved from one way of transport to the other.
The European Union's policy regarding transportation aims at the improvement of transport links between its member countries and between the EU and its neighbours in the east, most of them being determined to become members in the years to come.

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