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A Structural VAR analysis of Fiscal shocks on current accounts in Greece

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Abstract. *The present study is, in particular, an attempt to test the relationship between budget deficit and current account balance in Greece, from 1976 to 2009, using a structural autoregressive (SVAR) model. We focused on Greece because this country has presented in the last years seriously fiscal changes, and severely damage in the level of macroeconomic variables. We find that in case of Greece there is no long run relationship between budget deficit and current account deficit either in the presence or in absence of structural breaks in the data set. Further, Impulse Response Functions (IRFs) calculated in the framework of SVAR shows that increase in budget deficit increases the current account deficit, which is consistent with the twin deficit hypothesis.*

Keywords: Budget Deficit, Current Account Deficit, SVAR Analysis, Structural Breaks.

JEL Classification: H62, F32, C23.

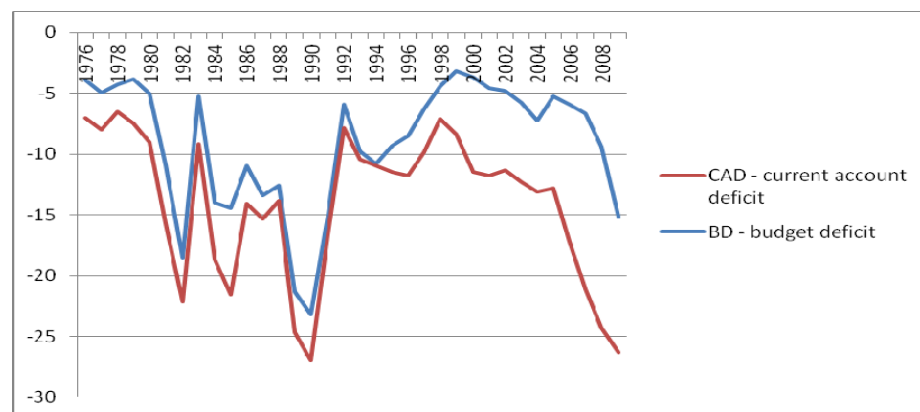
1. Introduction

The economy of Greece is going through a period of austerity to solve the debt crisis. The debt crisis shackled the economy in recent years and the European Union and other international bodies are helping the economy to recover from the crisis and to curb the spread of this crisis to other E.U countries. The Greek economy is experiencing high deficit in budget as well as in current account. The austerity plans and other measures are aimed at reducing the debt and to maintain fiscal prudence.

The budget and current account deficit is not a recent phenomenon in Greek economy. Kalou and Paleologou (2011) noted that the High level of military spending due to the military dictatorship in the 1960's, the Greek-Turkish armed race and the welfare spending in the 1980's by the socialist government caused an increase in government expenditure in Greece. Governments resorted to the extensive borrowing or seignorage to meet these raising expenditures instead of raising the government revenue. In the Figure 1 we provided the trend path of current account deficit and budget deficit as a percentage of GDP. Figure 1 shows that both deficits have a close relationship and moves in the same direction until 1994. However, thereafter, they start moving apart.

Whether the deficits in currents account and budget are related? The economic researches show that two different cases are possible: first one in which the fluctuations in budget deficits can be translated into current account (so called the twin deficits hypothesis), and second one in which the budget deficits do not affect current account deficits (known as Ricardian Equivalence Hypothesis - REH).

Figure 1. Plot of current account and budget deficits (as percentage of GDP)



In the case of twin deficits hypothesis, expansionary fiscal policy can increase the aggregate demand and the domestic interest rate. By consequence, this will generate capital inflow and appreciation of the currency. A strong currency can reduce the net exports, returning aggregate demand and output to their original levels.

In the case of Ricardian Equivalence Hypothesis, a reduction in the level of taxation, accompanied by an increase of budget deficit, will be followed by an increase in taxes on

the long term. In this case the private households save the income obtained through the tax cut in order to support the increase of the tax payment in the future. Thus, a budget deficit would not determine a twin deficit.

As Greece presents in the last years seriously fiscal changes, and severely damage in the level of macroeconomic variables, our paper studies the connection between budget deficit and current account balance in this country, from 1976 to 2009, using a structural autoregressive (SVAR) model. This choice has made in order to see the sensitivity of the results of vector autoregressive (VAR) model. We have used two variables: the current account deficit (CAD) and budget deficit (BD). The variance decomposition analysis of SVAR approach indicates that, for current account deficit, around 94% of the forecast error is explained by changes in the same variable, and only 6% is explained by the budget deficit. Whereas, for budget deficit, near 5% of the forecasting error is explained by the changes in current account deficit, and 95% is by its own changes. Similar, results are reported by our traditional VAR model also. For this reason, the results are not sensitive in respect to approach chosen for analysis.

The rest of the paper is organized as follows: Section 2 contains the literature review. Section 3 presents data and methodology. Section 4 shows empirical results and interpretation. Section 5 concludes.

2. Literature review

A plethora of studies in the literature has examined the relationship between fiscal/budget deficit and current account/trade deficit in different country context by using different methodologies. Nevertheless, these studies provide mixed results, since some of the studies supported twin deficit hypothesis while others rejected the hypothesis.

Noteworthy studies that supports the twin deficit hypothesis and arguing that the budget deficit causes trade deficit significantly are: Abel (1990), Zietiz and Pemberton (1990), Endres and Lee (1990), Batchman (1992), Kasa (1994), Egwaikhide (1999), Vamvoukas (1999), Kasibhatla et al. (2001), Lau and Lee (2002), Akbostanci and Tunc (2002), Ata and Yucel (2003), Kouassi, Mougoue and Kymn (2004), Cavello (2005), Erceg, Guirrieri and Gust (2005), Salvatore (2006), Frankel (2006), Kim and Roubini (2008), Holmes (2011), and Kalou and Paleologou (2011).

Noteworthy studies which have rejected the twin deficit hypothesis are: Enders and Lee (1990), Boucher (1991), Bilgili and Bilgili (1998), Kustepeli (2001), Papadogonas and Stournaras (2006), Corsetti and Müller (2006), Marinheiro (2008), Rafiq (2010), and Baharumshah, Lau and Khalid (2005). While Khalid and Guan, (1999) found long term relationship between fiscal deficit and current account deficit for developing countries; for developed countries they didn't find any long term relationship between fiscal deficit and current account deficit.

For the case of Greece, there are two recent main studies. In the first one, Papadogonas and Stournaras (2006) focused especially on the case of EU15 member-state and found that budget deficits have a small influence on the current account deficits. Contrary, for

the case of Greece, the current account depends by many factors, one of them being the general government balance.

In the second one, Kalou and Paleologou (2011) treated the case of Greece using a multivariate Vector Error Correction (VEC) framework, for the period 1960-2007. The authors included the endogenous determination of structural breaks in order to identify the causal relation between the budget deficit and the current account deficit. The main finding demonstrates that the two deficits are positively linked.

In the study, we use a SVAR model to examine the twin deficit hypothesis, as no other study has used SVAR analysis to examine the twin deficit in Greek context to the best of our knowledge. In addition to that, most of the studies used VAR approach to analyze the dynamic impacts of different types of random disturbances on the variables in the model (Ferreira et al. 2005) as it takes into consideration those interactions and all variables are treated as endogenous as a function of all variables in lags. However, the reduced form VAR does not consider the structural relationships among the variables unless some identification restrictions are assumed. The SVAR analysis is an attempt to solve the traditional identification problem. Therefore, the SVAR can be used to predict the effects of specific policy actions or of important changes in the economy (Narayan et al. 2008).

3. Data and methodology

For analysis we used annual data of BD (measured by budget deficit as a percentage of GDP) and CAD (measured by net current account as percentage of GDP) for the period 1970-2009. Data was accessed from International Monetary Fund (IMF) CD-ROM (2010). To check the order of integration of the data we have used the ADF and PP test. However, these tests can be misleading results when data series exhibits structural breaks. Perron's (1989) unit root test in this regard is the first attempt however, his test assumes that the structural break date is uncorrelated with the data and known ex-ante by economic information: for example, the 1973 oil price shock. However, the Perron (1989)'s assumption of exogenous breaks has been criticized and considered inappropriate due to problems associated with "pre-testing". Therefore, Perron's (1989) methodology invalidates the distribution theory of conventional testing and will tend to over reject the null of unit root. Instead, Zivot and Andrews (1992, hereafter ZA) treat the selection of the break points as the outcome of an estimation procedure. They transform Perron (1989)'s test into an unconditional unit root test that allows endogenously determined break points in the intercept and/or the trend function.

Following Perron (1989)'s notation, ZA (1992) test the null of unit root against the alternative of a one-time structural break with three models: Model A allows a one-time change in the level of the series, Model B permits a one-time change in the slope of the trend function of the series and Model C admits both changes. The regression equations corresponding to these three models are as following.

$$\text{Model A: } \Delta y = \mu + \beta t + \alpha y_{t-1} + \theta DU_t + \sum_{i=1}^k c_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

$$\text{Model B: } \Delta y = \mu + \beta t + \alpha y_{t-1} + \gamma DT_t + \sum_{i=1}^k c_i \Delta y_{t-i} + \varepsilon_t \quad (2)$$

$$\text{Model C: } \Delta y = \mu + \beta t + \alpha y_{t-1} + \theta DU_t + \gamma DT_t + \sum_{i=1}^k c_i \Delta y_{t-i} + \varepsilon_t \quad (3)$$

where DU_t and DT_t are break dummy variables for a mean shift and a trend shift, respectively. The shift occurs at each possible break point T_B ($1 < T_B < T$). Formally:

$$DU_t = \begin{cases} 1, & \text{if } t > T_B \\ 0, & \text{otherwise} \end{cases} \quad \text{and} \quad DT_t = \begin{cases} t - T_B, & \text{if } t > T_B \\ 0, & \text{otherwise} \end{cases} \quad (4)$$

where k is the number of lags determined for each possible break point by one of information criteria. The null hypothesis is $\alpha = 0$, which implies that the series exhibits a unit root with a drift and excludes any structural break points. The alternative hypothesis is $\alpha < 0$, which implies that the series is a trend-stationary with an unknown one-time break. So, equations (1), (2) and (3) are sequentially estimated and T_B is chosen so as to minimize the one sided t-statistics for testing $\hat{\alpha} = 0$.

After confirming, the same order of integration we proceeded to examine the long-term relationship between the variables using a battery of cointegration tests. Our battery of cointegration test is comprises of the Engle-Granger test (1987) test, Johansen (1988) test, Boswijk (1994) and Banerjee et al. (1998) and last but not least Lütkepohl et al. (2004).⁽¹⁾ Our choices to use a recent test developed by Lütkepohl et al. (2004) for cointegration analysis is based on to incorporate structural breaks in the data set. As if structural breaks are not analyzed we may lead to the biased results. There are a number of studies address testing for cointegration with structural shifts (see for details Lütkepohl et al. 2004) and these studies have considered single equation as well as systems cointegration tests but none of the proposed tests is appropriate for testing the cointegrating rank of a system when the break date is unknown. For such a situation Lütkepohl et al. (2004) proposed a cointegrating rank test for vector autoregressive (VAR) processes with a structural shift at unknown time in that the shift is assumed as a simple shift in the mean. The authors modelled a structural shift as a simple shift in the level of the process. The structural break date is estimated based on a full-unrestricted VAR model. In the next step, they applied Johansen type test for the cointegrating rank to the adjusted series. Their test is generalized version of the test proposed by Saikkonen and Lütkepohl (2000). It proceeds by estimating the break date in a first step based on a full VAR process in levels of the variables. Then the parameters of the deterministic part of the data generation process (DGP) are estimated by a suitable procedure and these estimators are used to adjust the original series for deterministic terms including the structural shift. Finally, to test for a cointegrating rank the Johansen likelihood ratio (LR) type test is performed to the adjusted series. This test has a great advantage: the asymptotic distribution of the test statistic under the null hypothesis is the same as in the case of a known break date and does not depend on the break date.⁽²⁾

Further, most of the studies until now have analysed the cointegration relationship between CAD and BD and no study has attempted to analyse the dynamics of the relationship between these variables. Therefore, the present study is the first one attempt in this direction and to do so, we used two competing approaches of analysing the dynamics of the relationship between CAD and BD namely, VAR and SVAR. SVAR is used to see the sensitivity of the results of our VAR model and also use of this approach do not exists, to the best of our knowledge, for the Greek context.

The SVAR is superior to the VAR in the sense; the reduced form VAR does not consider the structural relationships among the variables unless some identification restrictions are assumed. In this sense, SVAR analysis is an attempt to solve the traditional identification problem. Therefore, the SVAR can be used to predict the effects of specific policy actions or of important changes in the economy (Narayan et al. 2008). Hence, policy makers and economic forecasters the cause the results obtained from the model to predict how some variables, for example, current account deficit respond over time to changes in policies.

Our bivariate system for empirical analysis is given by,

$$x_t = [CAD_t, BD_t]' \quad (5)$$

Let us consider the following infinite-order vector moving average (VMA) representation:

$$\Delta x_t = B(L)\xi_t, \quad (6)$$

where L is a lag operator, Δ is a difference operator, and $\xi_t = [\xi_{a,t}, \xi_{b,t}]'$ is a (2×1) vector for the covariance matrix of structural shocks Ξ . The error term can be interpreted as the relative CAD shocks, and BD shocks. We assume that structural shocks have no contemporaneous correlation or autocorrelation i.e., we assume that Ξ is a diagonal matrix. Further, for estimation purpose we used the following finite-order VAR model:

$$[I - \Psi(L)]\Delta x_t = v_t, \quad (7)$$

where $\Psi(L)$ is a finite-order matrix polynomial in the lag operator and v_t is a vector of white noise disturbances. Provided that the stationarity condition is fulfilled, equation (7) can be transformed in the VMA representation as follows:

$$\Delta x_t = A(L)v_t, \quad (8)$$

where $A(L)$ is a lag polynomial. From the equations (6) and (8) one can formulate a linear relationship between ξ_t and v_t as follows:

$$v_t = B_0\xi_t, \quad (9)$$

where B_0 is a 2×2 matrix of the contemporaneous structural relationship between the two variables. Additionally, identification of the vector of structural shocks is necessary so that it can be recovered from the estimated disturbance vector. Hence, four parameters are required in the present case to convert the residuals from the estimated VAR into the original shocks, which drive the behaviour of the endogenous variables. However, we

have three of the required four, which are given by the elements of $\Xi = B_0 B_0'$. Therefore, only one identifying restriction is needed to be added. So, in order to impose one additional restriction we followed model of Blanchard and Quah (1989) and used economic theory to impose restrictions. Thus, we impose one additional restriction on the long-run multipliers while freely determining the short-run dynamics. Here we first imposed restriction on CAD shocks have no long-run impact on the levels of BD and next we imposed restriction on BD shocks have no long run impact on the level of CAD.

We have ordered the variable as CAD and BD. Firstly, we set restriction on CAD and assumed that CAD is affecting the BD and CAD is not getting response from BD. Secondly, we set restriction on BD and assumed that BD is affecting CAD and no response from BD to CAD. Hence, the long-run representation of equation (8) can be written as follows

$$\begin{bmatrix} \Delta CAD_t \\ \Delta BD_t \end{bmatrix} = \begin{bmatrix} B_{11}(1) & B_{12}(1) \\ B_{21}(1) & B_{22}(1) \end{bmatrix} \begin{bmatrix} \xi_{a,t} \\ \xi_{b,t} \end{bmatrix} \quad (10)$$

where $B(1) = B_0 + B_1 + B_2 + \dots = 0$ are long-run multipliers in our SVAR model (long-run effect of Δx_t). Firstly, we specify the long-run multiplier B_{12} equal to zero (i.e., $B_{12} = 0$), thus making the matrix a lower triangular matrix in the equation (10) and then we specify the long run multiplier B_{21} is equal to zero (i.e., $B_{21} = 0$), thus making the matrix an upper triangular matrix.

In the next step, we construct a SVAR and plot the impulse response functions (IRFs) of CAD, when a positive shock to BD occurs and in the final step, we study the forecasts error variance decomposition of SVAR model. Lag-length to be incorporated in our analysis of VAR and SVAR models is determined based on Akaike Information Criteria (AIC) because of its better performance in small sample (Liew, 2004).

4. Result and interpretations

The summary statistics is given in Table 1 given below.

Table 1. Summary statistics for the data

Full sample analysis					
Variables	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
CAD	-3.677654	3.586706	-1.316189	4.260591	12.06788 (0.002396)
BD	-6.949267	5.274816	-1.041087	3.293657	6.264054 (0.043629)

As a first step to analyze the cointegration between the variables, we employed Zivot-Andrews (1992) unit root test, which considers one endogenously determined structural break. The ZA test result along with the results of ADF and PP are given in Table 2. The

three models of ZA test provide the same result, both the study variables are intergraded at order 1 i.e., at level form both CAD and BD contains a unit root and in first difference from both become stationary.

Table 2. ZA Unit Root Estimation with one structural break

Variable	ADF	PP	ZA unit root test					
			Model A		Model B		Model C	
			t-statistic	Decision	t-statistic	Decision	t-statistic	Decision
BD	-2.67	-2.66	-3.848 [1992]	Contains unit root	-3.164 [1983]	Contains unit root	-4.409 [1992]	Contains unit root
D(BD)	-5.20	-6.74	-7.724 [1991]	Does not contain unit root	-6.694 [1999]	Does not contain unit root	-7.648 [1991]	Does not contain unit root
CAD	-1.79	-1.68	-3.718 [1986]	Contains unit root	-3.697 [1995]	Contains unit root	-3.819 [1991]	Contains unit root
D(CAD)	-4.34	-4.33	-6.300 [1986]	Does not contain unit root	-5.510 [1987]	Does not contain unit root	-6.042 [1986]	Does not contain unit root

ZA test-Critical values: 1%: -5.57 5%: -5.08 for model when breaks occur in intercept and trend both; Critical values: 1%: -5.43 5%: -4.80 for model when breaks occur in intercept only; Critical values: 1%: -4.93 5%: -4.42 for model when breaks occur in trend only.

The first order integration of the study variables allows us to proceed with cointegration analysis, since first order integration is the necessary condition for cointegration analysis. We applied the Johansen's cointegration test, which does not consider the possibility of structural breaks in cointegration analysis and the structural cointegration procedure of LST (2004). As shown in Table 3, both the Johansen's cointegration test and the LST (2004) test show the same results i.e., the study variables are not cointegrated; there is no long term relationship between BD and CAD.⁽³⁾

Table 3. Cointegration tests⁽⁴⁾

Panel 1: Cointegration test- JJ [Trend assumption: Linear deterministic trend (restricted) Lags interval (in first differences): 1 to 2]					
Unrestricted Cointegration Rank Test (Trace)					
H ₀	H _a	Eigenvalue	Trace Statistic	5% Critical Value	Prob.**
None	At most 1	0.248121	12.03213	20.26184	0.4459
At most 1	At most 2	0.086822	2.906369	9.164546	0.5983
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)					
H ₀	H _a	Eigenvalue	Max-Eigen Statistic	5% Critical Value	Prob.**
None	At most 1	0.248121	9.125766	15.89210	0.4204
At most 1	At most 2	0.086822	2.906369	9.164546	0.5983
Panel 2: Cointegrating rank Tests- LST (2004): Endogenously determined break date (1991) and constant assumption is linear deterministic trend (restricted) lags interval (in first differences): 1 to 2]					
H ₀	H _a	Eigenvalue	Trace Statistic	5% Critical Value	1%Critical Value
None	At most 1	0.3785513	14.41	15.83	19.85
At most 1	At most 2	0.1380373	4.14	6.79	10.04

Note: (1)* denotes rejection of the hypothesis at the 0.05 level and **MacKinnon-Haug-Michelis (1999) p-values; (2) Critical values of Lütkepohl et al. (2004) test are from Trenkler (2003).

Source: Author's calculation.

Further, for analyzing the non-stationary series in a VAR system Ramaswamy and Sloek (1997) mentions three possible ways to specify. First, either to specify the series in differenced form, second, to specify them in levels, and third to consider the cointegration relationships among the test variables by applying a vector error correction model (VECM) and this is considered when the cointegration relationship is known. In addition, if the cointegration relationship is unknown, VECM can be biased and it could be more appropriate to consider the VAR in levels. Therefore, in this paper, we apply a VAR and a structural VAR model in first differenced series, as we do not have cointegrating relationship among the test variables but variables are nonstationary.⁽⁵⁾

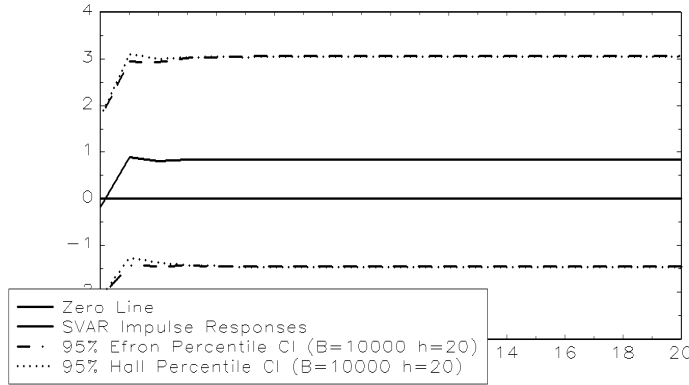
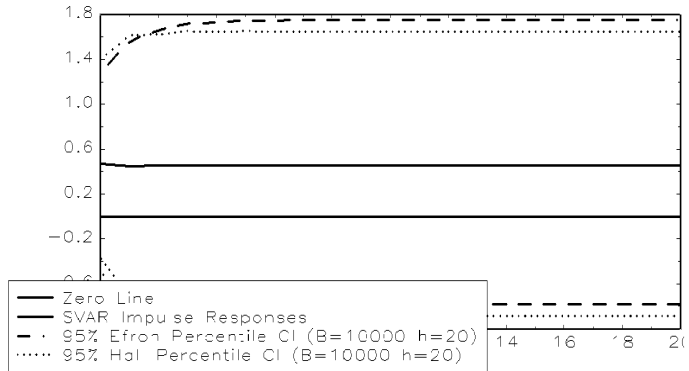
To examine the dynamic relationships between the variables, we applied the VAR methodology. The result of VAR analysis is given in Table 2.1 of Appendix 2, which shows that in the first model i.e., in case of D(CAD), the lagged values of CAD or BD are not significantly affecting CAD. Similarly, for D(BD) model, lagged values of both CAD and BD are not significantly affecting BD.

The diagnostics tests of VAR model is illustrated in Figure 3.1 in Appendix 3. The IRFs in Figure 3.2 of the same Appendix 3 shows that the response of CAD to one SD innovations in CAD is positive in the initial years and it becomes zero from 3 year onwards. Similarly, we estimated the response of CAD to one SD shocks in BD, which is negative in the initial years and then turns out to be zero. In the case of BD, one SD shocks in CAD has initial impact positive however, later its impact becomes zero. However, for BD, shocks in BD itself has a large positive effect on BD in first two years and then it becomes negative, later the responses becomes zero.

We also analysed the variance decomposition analysis and presented results in Table 4, which shows that for CAD more than 99% of the variance is explained by the shocks in CAD itself. However, for BD 4.5% of the variances is explained by the shocks in CAD, rest is by its own shocks.

Finally, we analysed the relationship between the variables in SVAR framework, by putting restrictions on the VAR model. Since we have a sample size which is not large enough therefore, we have followed Benkwitz et al. (2001) which suggest that for small sample, properties of bootstrap confidence intervals are better in comparison to other asymptotic methodologies. Therefore, we have computed bootstrap percentile 95% confidence intervals (by following Hall 1992; Efron and Tibshirani 1993) with 1000 bootstrap replications to illustrate parameter uncertainty. The horizon of all responses is 20 years. In the following Figures 2 and 3, the Impulse response function of both models in SVAR is given.

As shown in Figure 2, one SD shocks in D(CAD) has a positive effect on D(BD) throughout the 20 year period. This implies that an increase in BD increases the CAD. This is expected as par the Twin deficit hypothesis. On the other hand, the effect of one SD shocks on D(CAD) to D(BD) is also positive, but the effect is less compared to the previous model.

Figure 2. IRFs of CAD to BD in SVAR**Figure 3.** IRF of BD to CAD in SVAR

Further we analyzed the Variance decomposition analysis in SVAR framework, which explains how much of the forecasting error variance of each variable can be explained by its own innovations and changes in other variable. The VD analysis of BD indicates that around 95% of the forecasting error is explained by changes in the same variable and around 5% by the changes in CAD.

Table 4. Variance decomposition analysis of BD and CAD

	Variance Decomposition of BD		Variance Decomposition of CAD	
	CAD	BD	BD	CAD
1	0.00	0.1	0.07	0.93
2	0.05	0.95	0.06	0.94
3	0.05	0.95	0.06	0.94
4	0.05	0.95	0.06	0.94
5	0.05	0.95	0.06	0.94
10	0.05	0.95	0.06	0.94
15	0.05	0.95	0.06	0.94
20	0.05	0.95	0.06	0.94

5. Conclusions

Twin deficit hypothesis is an extensively tested hypothesis in economics. Nevertheless, the literature in this area is not conclusive, since various studies provide results in favour of or against twin deficit hypothesis. The effect of BD on CAD is attracting the attention of policy makers in recent years, since the fiscal stimulus packages implemented to fight the recent economic crisis increased the BD of many countries. In this study, we analysed the effect of BD on the CAD of a Greece, which is facing a debt crisis in recent years.

We find that in case of Greece there is no long run relationship between BD and CAD either in the presence or in absence of structural breaks in the data set. Further, the dynamic analysis of the variables analysed through VAR show that the lagged values of CAD or BD are not affecting each other significantly. However, IRF analysis shows that BD is negatively affecting the CAD in the initial years, whereas the effect of CAD on BD is positive in the initial years. The variance decomposition analysis of VAR model shows that the forecasting error variance of BD and CAD is explained by its own changes. Further, IRFs calculated in the framework of SVAR shows that increase in BD increases the CAD, which is consistent with the Twin deficit hypothesis. However, the VD analysis shows that the major proportion of forecasting errors of the study variables is explained by own changes.

Notes

- (1) The Engle-Granger test (1987) test is based on two step procedure. First we extract residuals from a regression of one variable on the second and in the second step we apply DF/ADF type test on extracted residuals. In this test one could also control for serial correlation by the semiparametric approach of Phillips and Ouliaris (1990). This test is useful in two variables case only. The Johansen (1988) test is a system based test, which is applicable for more than two variables also. The Boswijk (1994) and Banerjee et al. (1998) test is based on error correction. A detailed procedure on these tests is available in Bayer and Hanck (2009). They combined these test and developed more powerful tests, which can be implemented through single STATA command.
- (2) For the purpose of brevity we have avoided to present the detailed literature on this test which an interested reader can refer from the original paper.
- (3) Steps for cointegration analysis are nicely presented in Tiwari (2011) and results of all analysis are presented in the Appendix 1 in various tables. The lag selection test in presented in Table 1.1, model selection test in Table 1.2, while the diagnostic check analysis is showed in Table 1.3.
- (4) Further, we applied Engle and Granger (1987), Banerjee et al. (1998), Boswijk (1994) and two tests of Bayer and Hanck (2009) test for Cointegration (namely EG-J: and EG-J-Ba-Bo). Test statistics of Engle-Granger (1987), Banerjee et al. (1998), Boswijk (1994) tests with p-value in parenthesis are 1.7235 (0.6635), 8.7487(0.3688), -2.0133(0.4107), 6.7757 (0.2529) respectively. Test statistics of EG-J: and EG-J-Ba-Bo with 5% critical values in parenthesis are 2.8154544 (11.229) and 7.3447612 (21.931).
- (5) Structural VAR Estimation Results of contemporaneous impact and long run impact are shown in Appendix 3.

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Appendix 1

Table 1.1. Lag length selection test

VAR Lag Order Selection Criteria						
Endogenous variables: CAD BD						
Exogenous variables: C						
Sample: 1976 2009						
Included observations: 31						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-178.5936	NA	393.6604	11.65120	11.74371	11.68136
1	-147.4746	56.21486*	68.51483*	9.901589*	10.17913*	9.992062*
2	-145.8117	2.789412	80.02170	10.05237	10.51495	10.20316
3	-144.2242	2.458056	94.45266	10.20801	10.85562	10.41912
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Table 1.2. Model selection test

Sample: 1976 2009					
Included observations: 32					
Series: BP BD					
Lags interval: 1 to 1					
Selected (0.05 level*) Number of Cointegrating Relations by Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	0	0	0	0	0
Max-Eig	0	0	0	0	0
*Critical values based on MacKinnon-Haug-Michelis (1999)					
Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood by Rank (rows) and Model (columns)					
0	-156.5778	-156.5778	-156.3645	-156.3645	-156.1702
1	-154.9184	-152.0149	-151.9902	-151.4990	-151.4071
2	-154.8854	-150.5617	-150.5617	-148.3284	-148.3284
Akaike Information Criteria by Rank (rows) and Model (columns)					
0	10.03611*	10.03611*	10.14778	10.14778	10.26064
1	10.18240	10.06343	10.12439	10.15618	10.21294
2	10.43034	10.28511	10.28511	10.27053	10.27053
Schwarz Criteria by Rank (rows) and Model (columns)					
0	10.21933*	10.21933*	10.42261	10.42261	10.62707
1	10.54883	10.47567	10.58243	10.66003	10.76259
2	10.97999	10.92637	10.92637	11.00339	11.00339

Table 1.3. *Diagnostic checks analysis*

VEC Residual Serial Correlation LM Tests		
1lag	3.592163	0.4640
VAR Lag Exclusion Wald Tests :Chi-squared test statistics for lag exclusion:		
1lag	2.716297	0.606366
VEC Residual Normality Tests-Joint J-B test (Orthogonalization: Residual Covariance (Urzua)		
4.025691		0.9097
VEC Residual Heteroskedasticity Tests: Includes Cross Terms (Joint test of Chi- square)		
10.40376		0.7936
Source: Author's calculation		

Appendix 2

Table 2.1. *VAR estimates*

Vector Autoregression Estimates		
Sample (adjusted): 1978 2009		
Included observations: 32 after adjustments		
Standard errors in () & t-statistics in []		
	D(CAD)	D(BD)
D(CAD(-1))	0.147415 (0.20326) [0.72525]	0.559309 (0.51417) [1.08778]
D(BD(-1))	-0.021755 (0.07313) [-0.29748]	-0.209175 (0.18499) [-1.13076]
C	-0.199695 (0.33349) [-0.59880]	-0.150604 (0.84360) [-0.17852]
R-squared	0.019130	0.069400
Adj. R-squared	-0.048517	0.005221
Sum sq. resids	98.12105	627.8727
S.E. equation	1.839425	4.653040
F-statistic	0.282788	1.081348
Log likelihood	-63.33349	-93.03166
Akaike AIC	4.145843	6.001979
Schwarz SC	4.283256	6.139391
Mean dependent	-0.250152	-0.320283
S.D. dependent	1.796364	4.665234
Determinant resid covariance (dof adj.)		73.25234
Determinant resid covariance		60.16134
Log likelihood		-156.3645
Akaike information criterion		10.14778
Schwarz criterion		10.42261

Appendix 3

Figure 3.1. *Diagnostics tests of VAR model*

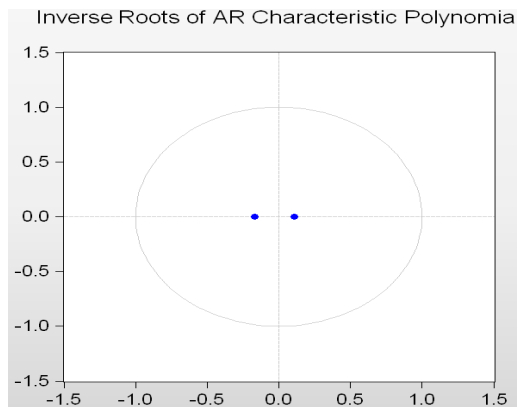
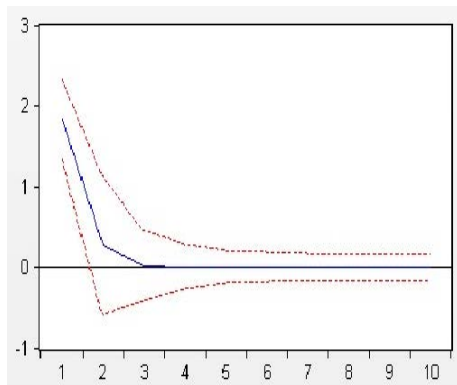
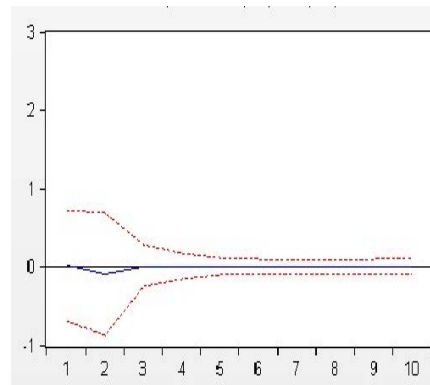


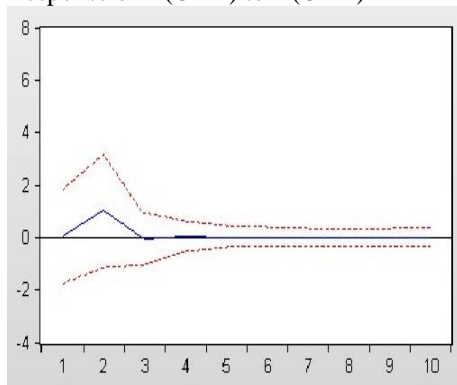
Figure 3.2. *IRFs of VAR analysis*



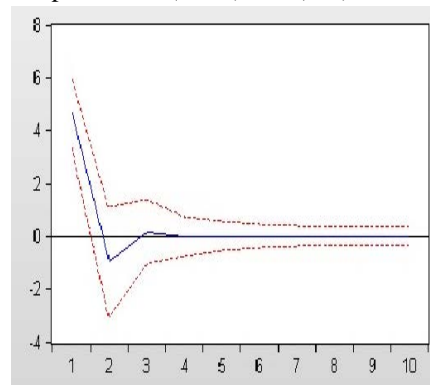
Response of D(CAD) to D(CAD)



Response of D(CAD) to D(BD)



Response of D(BD) to D(BD)



Response of D(BD) to D(CAD)

Is CPI a suitable tool for inflation targeting? A critical view

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Abstract. *Since Frankel (2011, 2012) criticizes the choice of consumer price index as a policy index for its adverse impacts on the output in the developing economies, economists suggest different policy proposals in order to stabilize price level. One of them is to change price index in measurement of inflation. In this study, we investigate the suitability of an alternative price index in inflation targeting regime instead of consumer price index in Turkish economy. In this regard, we employ the producer price index instead of consumer price index in order to investigate the suitability of Frankel's policy proposals. The empirical results, obtained from conventional VAR analysis suggest that the impact of producer price on the inflation rate is in the short term and it is weak. Similarly, MS-VAR analysis by utilizing the monthly data for the period 2003M2 - 2013M6, show that there is not a significant impact of producer price on the inflation rate during the expansionary period and it is also possible to talk about the effect of supply side shocks in the recession regime. Therefore, the consumer price index seems to be an appropriate instrument to target inflation rate, but the producer price index should also take into account to target inflation during the recessionary period in Turkey.*

Keywords: Inflation targeting, CPI, PPI, MS-VAR.

JEL Classification: E52.

1. Introduction

With the collapse of Bretton Woods monetary system in the early 1970s, high inflation rate has become one of the most important problem in both developed and developing countries (Hall and Mankiw, 1993). The monetary policymakers have begun to search for new solutions for high and permanent inflation problem. Although a number of monetary policy rules were implemented in order to stabilize economy in especially developing countries, any one of them was not more successful and popular than inflation targeting regime.

The Central Bank of Republic of Turkey has been implementing inflation targeting regime after the country's worst economic crisis in 2001. Initially, implicit targeting accepted as one of the main components of the stabilization package, called "Transition to Strong Economy Program". Later on, an explicit inflation targeting regime was initiated and, as a result, Turkey has finally seen a single digit inflation rate in 2005. While implementing inflation targeting regime, the Turkish economy has also experienced a relatively high growth period during this period.

There has been a number of researches which emphasize the importance and significance of inflation targeting regime in controlling inflation rate in the countries where it has been implemented (Svensson, 1997, 1998; Bernanke et al., 1999; Mishkin, 1999; King, 2002; Filho, 2010; Abo-Zaid and Tuzemen, 2011). However, recently inflation targeting regime in developing countries has been heavily criticized in a number of ways (Eipstein, 2003; Akyuz, 2006; Galindo, 2006; Jha, 2006; Lim, 2006; Eipstein and Yeldan, 2007; Stiglitz, 2008; Frankel, 2011, 2012). The reason for these critics is that the central banks mainly focus on inflation targeting regime instead of poverty, employment, investment or economic growth. In this regard, implementation of inflation targeting has generated significant costs: slow growth, lower employment growth and high real interest rates. The current global financial crisis and economic stagnation mainly in developed countries brings another point into mind. That is financial stability.

The aim of this paper is to empirically investigate whether consumer price index as argued by the proponents of inflation targeting or producer price index as argued by the opponents of inflation targeting (Frankel, 2011, 2012) are better tool to be employed in targeting inflation in Turkey. The contribution of this study is twofold. First, this study investigates the success of inflation targeting regime in stabilization of output. The results also indicates whether the high growth rate is a result of high foreign capital entrance into the economy or controlling inflation rate that affects the real sector positively in the Turkish economy. To this end, this paper examines the relationship among producer price index, inflation rate and industrial product index in Turkey for the period 2003M2-2012M9. Secondly, this study employs newly developed econometric methods namely frequency domain causality approach and MS-VAR methods in order to analyze interaction between variables in different frequencies and also in different regimes.

The empirical results show that there is no significant impact of producer price index on the inflation rate during the expansionary period and but there might be supply side shocks on inflation targeting in the recession regime. Therefore, the consumer price index

seems to be an appropriate instrument to target inflation rate, but the policy makers should also take into account the producer price index during the recessionary period in Turkey.

We organize the rest of paper as follows. In the next section, we try to explain details of inflation targeting regime. In the third section, we summarize the critics about the inflation targeting regime. In the fourth section, we list the alternative policy proposals and then we give information about the Turkish economy case. We present the data and the methodology in section six. Finally, we summarize the results and policy implications in the section seven and eight.

2. Details about Inflation Targeting Regime

Inflation targeting is a particular example of the neo-liberal approach to central banking. A neo-liberal central bank attempts to keep inflation at a very low level, reduces support for government fiscal deficits helps to manage the country's integration into world trade and financial markets, reduce the influence of democratic social and political forces on central bank policy (Eipstein, 2003).

Since 1990, inflation targeting has been adopted by many industrialized countries (New Zealand, Canada, the United Kingdom, Sweden, Israel, Australia and Switzerland), by several emerging market countries (Chile, Brazil, Korea, Thailand, and South Africa) and by several transition countries (Czech Republic, Poland and Hungary) (Mishkin, 2001, 1). During the past decade, popularity of inflation targeting has grown among central bankers and economists. While New Zealand was the first country adopting explicit inflation targeting regime, it is certainly no longer alone (Walsh, 2003, 830). Today it is more than ever before and the number of countries is twenty seven.

In an inflation targeting regime, there are five important components (Eipstein and Yeldan, 2007, 2). These are absence of any other nominal anchors; such as exchange rates or nominal GDP, an institutional commitment to price stability, absence of fiscal dominance, policy independence and policy transparency and accountability.

Implementation of inflation targeting regime can be classified under different categories. If the central bank announces official targets, it will be explicit inflation targeting regime. Otherwise it is called implicit targeting regime. If the bank takes forecasts about inflation, it is called as inflation forecast targeting, otherwise actual inflation targeting regime. Another classification can be made according to price index used in measurement of inflation rate Svensson (1998). The bank may use consumer price index, inflation deflator, producer price index and etc. Frankel (2011) states that although there a number of interpretations of price index, all orthodox interpretations focus on CPI as the choice of price index.

3. Critics of Inflation Targeting Regime

Inflation targeting regime has several advantages as a medium term strategy for monetary policy (Mishkin, 2000). There are a number of economists supporting the implementation of inflation targeting regime. Svensson (1997; 1998) supports inflation targeting regime because it decreases output fluctuations and time inconsistency problems. According to Svensson (1997), inflation targeting regime reduces inflation volatility and it helps to stabilize output level if it is applied flexible. Bernanke et al. (1999) emphasize that inflation targeting regime makes the disinflation process less costly. It is also an anchor for the expectations of public. So it can reduce the inflation level. Mishkin (1999) indicates that inflation targeting regime is successful in both decreasing inflation expectations and reducing the actual inflation rate. Moreover King (2002) implies that inflation rate is not only low after the beginning of inflation targeting regime; it is also less volatile and more persistent in the inflation targeting countries.

The studies of Filho (2010) and Abo-Zaid and Tuzemen (2011) support the implications of authors above. According to Filho (2010), inflation targeting regime helps to increase GDP and to reduce unemployment level in the countries which practice inflation targeting regime. Also Abo-Zaid and Tuzemen (2011) compare the inflation targeting countries and non-inflation targeting countries and concludes that inflation targeting countries are associated with lower and more stable inflation, as well as higher and more stable GDP growth even if they are developed or developing countries.

Although there are a number of positive ascriptions to the inflation targeting regime, the number of studies criticizing the inflation targeting regime has increased after the global financial crisis has started in 2008. Initial critics belong to Eipstein and Yeldan (2007). According to them, the world economy is growing too slowly to generate sufficient jobs and it is allocating a smaller proportion of its income to fixed capital formation nowadays. Similarly, Akyuz (2006) emphasizes that the source of macroeconomic instability now is not instability in product markets but asset markets, and the main challenge for policy makers is not inflation, but unemployment and financial stability.

Especially in developing countries, the central banks focus on inflation targeting regime instead of poverty, employment, investment or economic growth. In this regard, implementation of inflation targeting has generated significant costs: slow growth, lower employment growth and high real interest rates. Besides, Frankel (2011) states that many countries have experienced highly variable terms of trade in recent years, as a result of unusually high volatility in world price of oil, minerals and agricultural products. Terms of trade volatility poses a serious challenge to the inflation targeting approach to monetary policy. Inflation targeting had been favored monetary regime in many quarters. But the shock of the last five years have shown some serious limitations to inflation targeting, much as the currency of the late 1990s showed some serious limitations to exchange rate targeting (Frankel, 2011, 78).

Moreover, Frankel (2011) suggests that inflation targeting regime is not successful in developing countries not like developed countries. Because, the theoretical models determining the intervention into the economy, usually do not take into consideration

exogenous shocks in trade conditions or difficulties in the external accounts. The theories tend to assume that countries need not to worry about financing trade deficits internationally. However, in reality, financial market imperfections are serious for developing countries (Frankel, 2012, 6). On the other hand, economists who analyze the inflation targeting regime do not take supply shocks into account sufficiently. According to Frankel (2011), supply shocks tend to be larger for developing countries than for industrialized countries. Because farming, fishing and forestry sectors have a big portion in the whole economy. An unexpected climatic event such as hurricane, floods would have affect GDP more than developed countries' GDP.

Stiglitz (2008) criticizes the application of inflation targeting regime in another way. According to him, as a result of increasing oil price, consumer price index will tend to increase and central bankers would raise the interest rate in order to prevent it. Increasing interest rate probably could not be able to decrease increasing oil and agricultural product prices in especially developing countries. Besides increasing oil price, increase in interest rates would also reduce the aggregate demand in the economy. So recession in the economy would be deeper. In this regard, Stiglitz's suggestion is that if the global food and energy prices increased, public would have to accept a higher inflation rate. Frankel (2011) implies similar results in the case of an increase in oil price. Implementation of tightening monetary policy like raising indicative interest rate in order to appreciate nominal exchange rate would contract the economy which will not be able to adjust the terms of trade in favor of the country.

On the other hand, if the price of the export commodity rises in the world markets, an inflation targeting regime based on consumer price index prevents monetary tightening consistent with appreciation as called for in response to an improvement in the terms of trade (Frankel, 2012:78).

Lim (2006) emphasizes on the supply side of the inflation. According to Lim (2006), a currency depreciation, oil price shock or agricultural price shock generate the supply side of inflation rate. In this context, he criticizes the inflation targeting regime, because it takes demand side of the inflation into consideration only. According to him, as a result of increase in interest rate due to increase of oil price, stagflation problem would occur.

Insufficient conditions for implementing the inflation targeting regime are another argument to discuss. Jha (2006) states that in the presence of high capital inflows and outflows, inflation targeting regime can not be conducted as a single monetary policy. Addition to Jha (2006), Galindo (2006) indicates that there are important concerns about the effectiveness of an inflation targeting regime under weak fiscal conditions, poorly regulated financial systems, large potential external shocks, low institutional credibility and currency substitution phenomena.

The costs of implementation of inflation targeting regime are listed by Eipstein (2003, 4) as follows:

1. It is true that countries that adopt inflation targeting often achieve lower inflation rates, but they do not do so at any lower cost than other countries in terms of forgone output.

2. Inflation targeting regime does not appear to increase credibility of central bank policy.
3. Central banks reduce inflation do so old-fashioned way: by raising interest rates, causing recessions or slow growth.

It is clear that inflation targeting regime is not robust to supply side shocks such as oil price increase as indicated by a number of researchers. In the case of an increase in inflation rate because of supply shock, monetary authorities would raise the monetary policy interest rate and it would reduce the level of output in addition to supply shocks' negative effect on output level.

4. Alternative policy proposals

The negative impacts of inflation targeting regime on the economy bring some policy proposals for developing countries. These can be classified under two groups. In the first group, policy proposals suggest different nominal anchors. Meltzer (1987) and McCallum (1988) suggest monetary base as a nominal anchor while Ball (1998) suggests the nominal exchange rate as an anchor. In the nominal targeting regime Meade (1978) suggests the GDP as an alternative. Although each targeting proposal has some advantages, inflation targeting regime is superior to all of them and a lot of them were tested before. So, it is the question that how we can recover the inflation targeting regime?

It is clear that inflation targeting has advantages compare to other policy implementations. In contrast to an exchange rate peg, inflation targeting enables monetary policy to focus on domestic considerations and respond to shocks to the domestic economy. In contrast to monetary targeting, inflation targeting has the advantage that a stable relationship between money and inflation is not critical to its success (Mishkin, 2000). Also it is easily understood by the public. Despite all superiorities of inflation targeting regime, it is built on aggregate demand; application of the regime reduces aggregate demand. The regime skips one of the main sources of inflation: supply side inflation. So if we can include the supply side of the economy into the index employed in the inflation targeting regime, it is possible to overcome the problem indicated above. Because of these reasons, in the second group of proposals, authors suggest to employ a different price index including components belonging employment and growth.

Frankel (2011, 2012) suggests alternative price indexes. First of them is to peg to export price (PEP). The proposal is to fix price of the commodity which the country is heavily specialized in the production, in terms of domestic currency. Frankel (2011) suggest to Chile to peg its currency to copper, to Jamaica to peg it currency to bauxite, to Argentina to peg its currency to soybean and so on. The central bank can adjust the price automatically in the case of appreciation or depreciation of national currency. The advantage of the PEP compare to CPI targeting is its ability to accommodate terms of trade shocks. Frankel (2011) investigates two categories of adverse terms of trade shocks: First, a fall in the price of the export in world markets and second, a rise in the dollar

price of the import on world markets (Frankel, 2011, 15). In the first case, PEP automatically depreciates national currency against the Dollar vice versa.

Frankel's (2012) second index proposal is to consider an export price index instead of a single commodity's export price: peg to export price index (PEPI). The mechanism of PEPI is the same with PEP. The difference is that to target a broad index of all export prices instead of only one commodity price. Because the economies has more than one main export commodity would need to take all commodities into consideration while adjusting nominal exchange rate parity.

Last index proposal suggested by Frankel (2011) is employing a product price index instead of consumer price index. It is a way to moderate the proposal still further to target a broad index of all domestically produced goods, whether exportable or not (Frankel, 2011, 16). The selling point of a production-based price index is it could serve as a nominal anchor while yet accommodating terms of trade shocks, in comparison to a CPI target.

Addition to Frankel's index proposals, Eipstein (2003) suggests an alternative policy. According to him, central banks are given a country appropriate target such as employment growth, unemployment, real GDP or investment, usually subject to an inflation constraint.

5. An alternative price index for the Turkish economy: producer price index

The Central Bank of Republic of Turkey has started to implement implicit inflation targeting regime in 2002 as one of the main components of "Transition to Strong Economy Programme". In this regard, consumer price index is employed to measure inflation rate movements. The bank has started to announce inflation targets officially and implemented explicit inflation targeting regime in 2006.

Contrary to implications of Stiglitz (2008) and Frankel (2011) criticizing inflation targeting because of contraction in the GDP, the Turkish economy grown continuously averaged 5,9% annually between years 2002 and 2008 while inflation targeting regime has been implementing. By the way, another important improvement in the economy is increasing amount of foreign capital inflow into the economy during this period. The total amount of foreign capital between 2003 and 2008 is 75.3 billion USD. While the Turkish economy experiences high growth rate for six years, a group economists claim that the high growth rate depends on the high amount of foreign capital entered into the economy.

In the light of the explanations, it is possible to test the last policy proposal of Frankel (2011, 2012) about employing inflation targeting regime by using PPI instead of CPI. By doing so, we will be able to investigate the success of inflation targeting regime in stabilization of output in the Turkish economy, whether the high growth rate is a result of high foreign capital entrance into the economy or reduction in inflation affect the real sector positively.

6. Data and methodology

The Turkish Statistical Institute publishes a number of explanatory statistics about price movements in the economy. Although the institute announces consumer price index (CPI) and wholesale product price index, there was no indicative data about product price index. The institute has started to announce producer price index (PPI) just before the beginning of explicit inflation targeting regime in 2005. In this price index, wholesale prices are excluded from the index and constructed index of product prices weighted by shares in output.

In this study, we employ monthly data belonging the period between 2003M2 to 2013M6. The producer price index is started to announce in January 2005. But the bank published the revised data from 2003. So, we obtain the producer price index (2003=100) and consumer price index in order to calculate inflation rate from the database of the Central Bank of Republic of Turkey and the industrial production index is obtained from the International Financial Statistics database published by International Monet fund.

6.1. Vector autoregressive analysis

In VAR framework, there are no exogenous variables and no identifying restrictions. The only role for economic theory is in specifying the variables to be included (McCoy, 1997, 2). In VAR methodology, each time series has to be stationary to include into analysis. Therefore, before including a variable into system, it is important to control stationary.

We can write system of simultaneous equations in a vector form as follows.

$$Ay_t = B(L)y_{t-1} + C\varepsilon_t \quad (1)$$

This is a general representation where y_t is a vector of endogenous variables, y_{t-1} is a vector of their lagged values, and ε_t is a white noise vector of the disturbance terms for each variable. A is a $n \times n$ square matrix and n is the number of variables that contains the structural parameters of the contemporaneous endogenous variables. $B(L)$ is a p th degree matrix polynomial in the lag operator L , where p is the number of lagged periods used in the model. C is a square matrix sized $n \times n$, contains the contemporaneous response of the variables to the disturbances or innovations.

McCoy (1997) mentioned that there is a problem with presentation in eq 1., because the coefficients in the matrices are unknown and variables have contemporaneous effects on each other. So it is not possible to determine the values of the parameters in the model. To fully identify model, it is possible to transform into a reduced-form model to derive the standart VAR representation in the following equation.

$$y_t = D(L)y_{t-1} + e_t \quad (2)$$

In this form, $D(L)$ equals to $A^{-1}B(L)$ and e_t equals to $A^{-1}C\varepsilon_t$. The last term in equation is serially uncorrelated (Ioannidis, 1995, 256). The matrix Σ is the variance/covariance of the estimated residuals, e_t , of the standart VAR.

$$\Sigma = \begin{vmatrix} \sigma_1^2 & \sigma_{12} & \dots & \dots & \sigma_{1n} \\ \sigma_{21} & \sigma_2^2 & \dots & \dots & \sigma_{2n} \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ \sigma_{n1} & \sigma_{n2} & \dots & \dots & \sigma_n^2 \end{vmatrix}$$

In this matrix Σ , there are $(n^2 - n)/2$ number of restrictions required to identify to system. Traditional VAR methodology proposes the identification restrictions based upon on a recursive structure known as Cholesky decomposition (Ioannidis, 1995, 256). Cholesky decomposition separates the residuals e_t into orthogonal shocks by restrictions imposed on the basis of arbitrary ordering of the variables and implies that first variable responds only to its own exogenous shocks, second responds to first variable 's and its own exogenous shocks. So the structure of matrix will be lower triangular, where all elements above the principal diagonal are zero (McCoy, 1997, 5).

After the identification of restrictions impulse response function (IRF) is employed to reflect the dynamic effect of each exogenous variable response to the individual unitary impulse from other variables. The IRF can explain the current and lagged effect over time of shocks in the error term (Liu, 2008, 243).

The variance decomposition is another test in the VAR analysis. Variance decomposition gives information about dynamic structure of system. The main purpose of variance decomposition is to introduce effects of each random shock on prediction error variance for future periods (Ozgen and Guloglu, 2004, 9).

6.2. Markov Switching Vector Autoregressive Model

Markov Regime Switching Model is a good tool for the monitoring the asymmetric behavior of such as unemployment rate in the historical process. The model examines behaviors of the time series in different regimes. The switching mechanism is controlled by an unobservable random variable. In these models, at any point of time during it is not possible to know which regime is effective. However, the observation probability of only one regime can be found at that time. Markov-switching autoregressive (MS-VAR) model was originally developed by Hamilton (1989) and used by Hamilton (1989, 1990, 1994, 1996), Kim and Nelson (1998), Krolzig (1997, 1998, 2000, 2001) for the empirical analysis of business cycle. Hamilton (1989) 2-regime MS-AR (p) model established by following form:

$$y_t = \begin{cases} \phi_{1,0} + \phi_{1,1}y_{t-1} + \dots + \phi_{1,p}y_{t-p} + \varepsilon_t & \text{if } (s_t = 1) \\ \phi_{2,0} + \phi_{2,1}y_{t-1} + \dots + \phi_{2,p}y_{t-p} + \varepsilon_t & \text{if } (s_t = 2) \end{cases} \quad (3)$$

$$y_t = \phi_{0,st} + \phi_{1,st}y_{t-1} + \dots + \phi_{p,st}y_{t-p} + \varepsilon_t \quad (4)$$

where $\phi_{1,j}$ and $\phi_{2,j}$ denote autoregressive lag parameters for every regime, s_t is the value of each regime, p shows degree of autoregressive process and ε_{it} is a sequence of independent and identically distributed random variables with mean zero and $\sigma_i^2 < \infty$ (Mohd, Zahid, 2006:57, Fallahi, Rodriguez, 2007:5). Regimes are determined by unobservable regime variable which is consistent with Markov regime switching model. Regime varies depending on past value and transformation probabilities and it can be written by following form:

$$\Pr(S_t = j | S_{t-1} = i) = P_{ij} \geq 0 \quad (5)$$

$i, j = 1, 2, \dots, k$ there are k different probable regimes and shows transition probabilities from regime i to regime j . This can be,

$$\sum_{j=1}^k \Pr(S_t = j | S_{t-1} = i) = 1 \quad (6)$$

the transition of regime variable between regimes is controlled with Markov model. This model is expressed as follows:

$$P[a < y_t \leq b | y_1, y_2, \dots, y_{t-1}] = P[a < y_t \leq b | y_{t-1}] \quad (7)$$

If a variable removed Markov model, we have to calculate current period which will be inside next period regime and transformation probabilities. (Hamilton, 1994: 679, Owen, 2004, 9)

$$P = \begin{pmatrix} P_{11} & \dots & P_{1k} \\ \vdots & \ddots & \vdots \\ P_{k1} & \dots & P_{kk} \end{pmatrix} \quad (8)$$

For example, if the probability of the every regime is determined by vector $\pi_t = (P_1, P_2, \dots, P_k)$ in t time, so the probability of the every regime is determined by $\pi_{t+1} = P' \pi_t$ in $t+1$ time. There is a ergodic probability vector, such as $\pi = P' \pi$, for stable Markov regime switching model. Ergodic probability vector can be considered as the unconditional probability of each regime. M -dimensional time series vector is defined as a conditional on $y_t = (y_{1t}, \dots, y_{mt})'$, $s_t \in \{1, \dots, k\}$ (Hamilton, 1998);

$$P(y_t | Y_{t-1}, X_t, s_t) = \begin{cases} f(y_t | Y_{t-1}, X_t, \theta_1) & \text{if } s_t = 1 \\ f(y_t | Y_{t-1}, X_t, \theta_m) & \text{if } s_t = k \end{cases} \quad (9)$$

where $P(y_t | Y_{t-1}, X_t, s_t)$ is the probability density function of the vector of endogenous variables $y_t = (y_{1t}, \dots, y_{mt})'$ which is conditional on the past behavior of the process,

$Y_{t-1} = \{y_{t-i}\}$ exogenous variables $X_t = \{x_{t-i}\}$. The terms s_t and θ_m represent, respectively, regime variable and parameter vector when the series is in regime k (Owen, 2004:7). The model is assumed to be linear in each regime $s_t = k$. In this context, if we consider white noise model as the autoregressive model and development models, $\varepsilon_{it} \square iid(0, \sigma_i^2)$

$$y_t = n_k + a_{k1}y_{t-1} + \dots + a_{kp}y_{t-p} + \varepsilon_t \quad (10)$$

Models represent soft transition following regime shifts of time series. On the contrary, it occurs a leap as the first and last time, when the time series shifted to the conditional mean in model (Ferrara, 2003:374-376);

$$y_t - m(s_t) = A_1(s_t)(y_{t-1} - m(s_{t-1})) + \dots + A_p(s_t)(y_{t-p} - m(s_{t-p})) + u_t \quad (11)$$

If stochastic model of y_t is defined as conditional on unobservable regime s_t , full description of the data generating mechanism, aims to specify stochastic model which occurs regime (Bildirici, Bozoklu, 2007, 5-6);

$$\Pr(s_t | Y_{t-1}, S_{t-1}, X_t, \rho) \quad (12)$$

where $S_{t-1} = \{s_{t-j}\}_{j=1}^{\infty}$ represents the history of the regime variable and it is not possible to observe its past but it might be found from observations and r is a vector of parameters of the regime generating process. In generally the regime variable cannot be observed and the historical behavior of the series must be obtained from the actual behavior of the process. Unobservable regime variable which generated by Ergodic Markov chain

explains transformation probabilities and it is defined by following form, $\sum p_{ij} = 1$ and $\forall i, j \in \{1, \dots, k\}$ (Fallahi, Rodriguez, 2007, 7-8);

$$p_{ij} = \Pr(s_{t+1} = j | s_t = i) \quad (13)$$

7. Empirical results

Before proceeding to application of conventional VAR and MS-VAR analysis, it is necessary to determine integration degree of variables. This can be done by the unit root tests of Dickey and Fuller (1979) (henceforth ADF), Phillips and Perron (1988) (henceforth PP), Elliot et al. (1996) (henceforth DF-GLS) and Kwaitkowski et al. (1992) (henceforth KPSS). The results from the unit root tests in Table 1 show that ADF, PP and DF-GLS test do not reject the null of a unit root for the levels of the variables. When the ADF, PP and DF-GLS tests are applied to the first differences of the variables, the results indicate that all variables are stationary. Consistent with these results, the KPSS test for the null hypothesis of stationary shows that the variables are stationary in the first difference form. The unit root analysis thereby implies that the variables are integrated of order one.

Table 1. Results for unit root tests

	Variables	ADF	DF-GLS	PP	KPSS
<i>Levels</i>					
Intercept	INF	-9.372 (0)	-3.695 (1)	-9.335 (6)	0.173 (2)
	PPI	0.402 (0)	2.789 (1)	0.199 (5)	1.251 (9)
	IPI	-1.426 (1)	0.087 (1)	-1.76 (0)	0.973 (9)
Intercept and Trend	INF	-9.418 (0)	-8.349 (0)	-9.378 (6)	0.036 (3)
	PPI	-2.636 (1)	-2.399 (1)	-2.615 (6)	0.14 (8)
	IPI	-2.232 (1)	-2.194 (1)	-3.217 (5)	0.101 (9)
<i>First-differences</i>					
Intercept	INF	-12.287 (1)	-16.733 (0)	-50.291 (50)	0.163 (28)
	PPI	-8.440 (0)	-7.667 (0)	-8.54 (5)	0.065 (5)
	IPI	-16.786 (0)	-1.839 (3)	-17.035 (2)	0.050 (5)
Intercept and Trend	INF	-12.262 (1)	-11.472 (1)	-53.798 (50)	0.12 (28)
	PPI	-8.442 (0)	-8.176 (0)	-8.537 (5)	0.032 (5)
	IPI	-16.722 (0)	-3.788 (2)	-16.978 (2)	0.051 (5)

Notes: For the KPSS test: *The asymptotic critical values of LM statistic for intercept 0.739, 0.463 at the %1 and %5 levels, ** the asymptotic critical values of LM statistic for trend and intercept 0.216, 0.146 at the %1 and %5 levels.

For the DF-GLS test: *The asymptotic critical values for without trend -2.591, -1.944 at the %1 and %5 levels. ** The asymptotic critical values for with trend -3.602, -3.1772 at the %1 and %5 levels. The figures in parenthesis denote the number of lags in the tests that ensure white noise residuals. They were estimated through the Schwarz criterion.

For the ADF test: * shows the results of Dickey Fuller test in the case of zero lag length and lag length chosen due to SIC criteria.** For the ADF test, the Mac Kinnon (1996) critical values for with constant -.3.485, -2.885, -2.579 at the 1%, 5% and 10% levels. The critical values for with constant and trend -4.035, -3.447 ve -3.148 at the 1%, 5% and 10% levels, respectively.

For the PP test: *Values in the parenthesis show bandwidths obtained according to Newey-West using Bartlett Kernel criteria. ** For the PP test Mac Kinnon (1996) critical values for with constant -3.483, -2.884, -2.579 at the 1%, 5% and 10% levels. The critical values for with constant and trend -4.033, -3.446 and -3.148 at the 1% 5% and 10% levels, respectively.

One of the important question in the VAR models is to select the optimal lag length. The most common and simple approach in selecting exact lag length is to re-estimate VAR model until the smallest Schwarz information criterion (SCI) value is found. Because comparing two or more models; the model with the lowest SCI is preferred (Gujarati, 2004, 537). According to Asteriou (2005) the judgment of the optimal length should still take other factors into account: For example autocorrelation, heteroskedasticity, possible ARCH effects and normality of residuals. In this study, we choose two lags based on Schwarz information criterion.

Another important question is the stability of the VAR model in order to get valid results from impulse response analysis. Stability would be achieved if the characteristic roots of the matrix coefficients have a modulus less than one. So we tested lag structure and

stability of the number of lag length with autocorrelation test and had a look at unit root graph. Graph showed that all roots are less than one and no roots are out of the unit circle. In autocorrelation test results imply that there is no autocorrelation.

Impulse response function derived from the VAR analysis is useful to trace out response of one variable to a shock in the error term of another variable. It can explain current and lagged effect over time of shocks in the error term (Liu et. al, 2008, 243). For this reason impulse response function is one of the important elements of the VAR analysis.

Table 2. *Conventional VAR analysis impulse response function*

M.	Response of Variables a Shock in Inflation Rate			Response of Variables a Shock in Producer Price Index			Response of Variables a Shock in Ind. Prod. Index		
	INF	PPI	IPI	INF	PPI	IPI	INF	PPI	IPI
1	0,0091	0,5185	0,5284	0,0026	1,7573	1,3504	0,0012	0,5201	4,5628
2	0,0028	0,3360	0,3235	0,0004	0,9061	-0,6810	-0,0011	0,2664	-3,0108
3	0,0015	-0,0752	-0,1225	-0,0013	0,4373	0,9313	0,0006	0,1276	1,3259
4	-0,0008	0,0340	-0,0245	-0,0031	0,2430	-0,2583	-0,0006	0,0956	-0,1912
5	-0,0001	0,0614	0,0420	0,0002	0,1728	0,1177	0,0001	0,0323	-0,1060
6	-0,0002	0,0106	0,0204	-0,0002	0,1033	0,0797	0,00004	0,0367	0,1406
7	-0,0000	0,0012	-0,0139	-0,0001	0,0488	-0,0169	-0,0009	0,0163	-0,0559
8	0,0001	0,0077	0,0039	0,0002	0,0321	0,0244	-0,0002	0,0077	0,0198
9	-0,0001	0,0043	0,0047	-0,0001	0,0206	0,0052	0,0001	0,0067	0,0027
10	-0,0778	0,0008	-0,0009	-0,0001	0,0107	0,0038	-0,0003	0,0032	-0,0024

Table 2 presents the impulse response functions of each variable. As shown Table 2, inflation rate responses positively to a positive shock in inflation rate. It is significant during a quarter. On the other hand, producer price index responses positively but it is significant less than a quarters. Finally, industrial production index responses it positively and the response is significant for two months.

In the case of a positive shock in producer price index, producer price index would response positively and it is significant for nearly four quarters. Moreover, inflation rate would response it positively, but it is weak and significant in the short term. The response of industrial production index is positive but insignificant.

Lastly, the response of industrial production index to a positive shock in industrial production index is positively. But it is insignificant after the first month. The producer price index responses positively and the response is relatively high. While it is significant for almost four quarters, the strength of the response decreases slowly. Finally the response of the inflation rate is insignificant and positive.

Secondly, we employ Markov Switching VAR (henceforth MS-VAR) model. In the MS-VAR model, the optimal lag length is found two according to Schwarz information criterion.

Table 3. *Determination of regime number and test statistics*

No. Of Regime	Log Probability	LR Linearity	Davies	AIC	SC
MS(2)	-4.261	168.7238 (0.00)	0.00	1.0572	2.4013
MS(3)	7.1379	191.5216 (0.00)	0.00	1.4011	3.4892
MS(4)	-8.2341	197.2341 (0.00)	0.00	2.8137	4.2517

Note: AIC denotes Akaike information criterion, SC denotes Schwarz information criterion, LR denotes probability rate.

According to LR linearity and Davies test statistics, all regimes have non-linear and asymmetric structure. Besides, AIC and SC test statistics accepts that there are two regimes which variables contracts or expands in recession or expansion periods. In the light of this finding, the transition probability matrices which obtained by using MSIA(2)-VAR(2) model is presented in Table 4.

Table 4. *Regime transition probability*

	Recession Regime	Expansion Regime
Recession Regime	0.3372	0.6628
Expansion Regime	0.0714	0.9286

According to regime transition probability table, the length of expansion regime is 3.5 years and the length of recession regime is nearly 2.7 years. The regime transition probability matrix also confirms that the speed of exit from recession regime is 2.09 quarters and the speed of entrance to recession regime is 1.07 quarters. The probability of entrance into a recession regime again after the recession regime is 0.34 and the probability of entrance into expansion regime again after the expansion regime is 0.92. On account of these results, prediction probability of permanency of expansion regime is very near to 1. The period which economy spends time in expansion regime is longer than the period spent in recession regime. This is an indicator of permanence in expansion regime.

After the determination of expansion and recession periods, we investigate the impulse response functions for each regime. First of all, we examine the impulse response functions for recession regime. The result is shown in Table 5. According to Table 5, the inflation rate responses positively to a positive shock in inflation rate. It is significant during a quarter. On the other hand, producer price index responses negatively and although it is significant for two quarters, it is so weak. Finally, industrial production index responses it positively and again although it is significant for two quarters, it is weak.

Table 5. *Impulse response function in recession regime*

M.	Response of Variables a Shock in Inflation Rate			Response of Variables a Shock in Producer Price Index			Response of Variables a Shock in Ind. Prod. Index		
	INF	PPI	IPI	INF	PPI	IPI	INF	PPI	IPI
1	0,9358	-0,0027	0,0002	0,0529	0,8043	-0,068	-2,709	1,51	0,091
2	0,6662	-0,0043	0,0004	0,1106	0,3990	-0,04	-1,982	2,09	-0,159
3	0,2737	-0,0046	0,0004	0,1378	-0,050	-0,005	-0,314	1,98	-0,200
4	-0,1270	-0,0037	0,0004	0,1275	-0,420	0,036	13,113	1,37	-0,160
5	-0,4362	-0,0020	0,0002	0,0868	-0,630	0,06	23,913	0,49	-0,070
6	-0,5879	-0,0003	0,00005	0,0304	-0,650	0,07	2,711	-0,36	0,0161
7	-0,5681	0,0016	-0,0001	-0,0252	-0,584	0,05	2,29	-1,01	0,090
8	-0,4076	0,0026	-0,0002	-0,0660	-0,240	0,03	1,368	-1,3	0,130
9	-0,1682	0,0028	-0,0003	-0,0841	0,030	0,004	0,2312	-1,22	0,130
10	-0,0778	0,0026	-0,0002	-0,0781	0,260	-0,02	-0,793	-0,84	0,100

In the case of a positive shock in producer price index, producer price index would response positively and it is significant for nearly a quarter. On the other hand, inflation rate would response it positively and it is relatively strong. The response of the inflation

rate increases when the time period expands. The response of industrial production index is negative and insignificant after the first quarter.

Lastly, the response of industrial production index to a positive shock in industrial production index is positively. But it is insignificant after the second month. The producer price index responses positively and the response is relatively high. While it is significant for two quarters, the strength of the response decreases slowly. Finally the response of the inflation rate is significant and negative.

According to results belonging recession regime, while the economy is into a recession period, an increase in producer price index would affect positively and induce an increase in inflation rate. This result is consistent with Frankel's (2011) policy suggestion. But the effect is relatively weak and it increases after a quarter.

Secondly, we investigate the impulse response functions for the expansion regime. The results are shown in Table 6. According to impulse response functions, inflation rate responses positively and it is significant for a quarter in the case of a positive shock in inflation rate. The producer price index and industrial production index response positively and but they are weak. While the response of producer price index is significant, another one is insignificant.

Table 6. *Impulse response function in expansion regime*

M	Response of Variables a Shock in Inflation Rate			Response of Variables a Shock in Producer Price Index			Response of Variables a Shock in Ind. Prod. Index		
	INF	PPI	IPI	INF	PPI	IPI	INF	PPI	IPI
1	0,1829	0,0010	0,0000	1,690	1,510	0,066	7,0300	-0,1300	0,4300
2	0,0130	0,0017	-0,1828	-2,400	2,250	-0,182	4,5800	-0,1820	0,1790
3	-0,0239	0,0026	0,0001	-3,350	3,360	0,205	2,4000	-0,2500	0,0600
4	-0,0391	0,0038	0,0002	-4,870	5,010	0,310	0,1321	-0,3600	0,0100
5	-0,0565	0,0057	0,0004	-7,200	7,480	0,460	0,0935	-0,5400	-0,0200
6	-0,0828	0,0086	0,0005	-10,720	11,170	0,690	0,0948	-0,8000	-0,0400
7	-0,1228	0,0128	0,0008	-15,980	16,670	1,040	0,1225	-1,2000	-0,0700
8	-0,1829	0,0191	0,0012	-23,850	24,880	1,550	0,1750	-1,7900	-0,1100
9	-0,2728	0,0285	0,0017	-35,580	37,130	2,320	0,2579	-2,6700	-0,1600
10	-0,4070	0,0424	0,0020	-53,100	55,420	3,470	0,3836	-3,9900	-0,2500

On the other hand, producer price index would response positively to a positive shock in producer price index positively as expected. Although, the response of inflation rate to the same shock is positive, it is insignificant. Similarly, industrial production index responses positively and it is insignificant too. Lastly, the response of industrial production index to a positive shock in its own structure would be positive as expected. While the response of producer price index is negative to the shock mentioned, inflation rate would response positively and strongly. The strength of the response would decrease after the first quarter.

According to results investigated above, an increase in producer price index would not affect the inflation rate not just like has been in the recession regime. As a result, the policy implication of Frankel's (2011) is not valid for the expansion regime in the Turkish economy.

7. Conclusion

In this study, we aim to analyze the effect of producer price index on the inflation rate in the context of Frankel's (2011 and 2012) policy suggestion indicating that another price index has to be used instead of consumer price index.

First of all, we employ conventional VAR analysis in order to investigate the responses of variables to a shock in other variables. VAR analysis results show that there is a weak effect of producer price index on the inflation rate. Secondly, we investigate the relation by MS-VAR approach which analyzes the time series in different regimes. This approach gives opportunity to analyze the economy in recession and expansion regimes, respectively. Results show that there is no effect of producer price index on the inflation rate while the economy is in expansionary regime. On the other hand, an increase in producer price index raises inflation rate in recession regime. That is consistent with Frankel (2011). An increase in oil price or other terms of trade shock would raise the producer price index in the recession regime in the Turkish economy. But the persistency of the effect and the weakness of the response during the time reduce the possibility of employing producer price index as a single price index while implementing inflation targeting regime.

In the light of these results, it is not possible to say that Frankel's policy proposal is suitable for the Turkish economy exactly. Because the results show that the inflation is based on demand side of the economy, while the supply side of the economy contributes to inflation during the recessionary period. Therefore, the consumer price index seems to be an appropriate instrument to target inflation rate, but the producer price index should also take into account to target inflation during the recessionary period in the Turkish economy.

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A new beginning for SMEs development?

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Abstract. *In the first part of our paper we emphasize the role of SMEs in achieving sustainable economical, social and environmental goals, in both emerging and developed economies. In the second part of the paper we briefly present the macroeconomic trends and business climate for SMEs during crisis and post-crisis, while further are presented the most common conventional and alternative financing solutions for SMEs. The fifth part of the paper represents an inquiry about the government authorities' role in supporting SMEs. The paper concludes with the recent changing paradigm related to SMEs financing, from a passive intervention of authorities towards a closer approach to real economy, providing the paths towards a robust and sustainable growth.*

Keywords: financial gap, business angels, mezzanine financing, credit guarantee, SMEs, financing solutions, financial crisis, government policies, structural funds.

JEL Classification: E51, G01, G21, G23, G24, G32, G38, H81, L2.

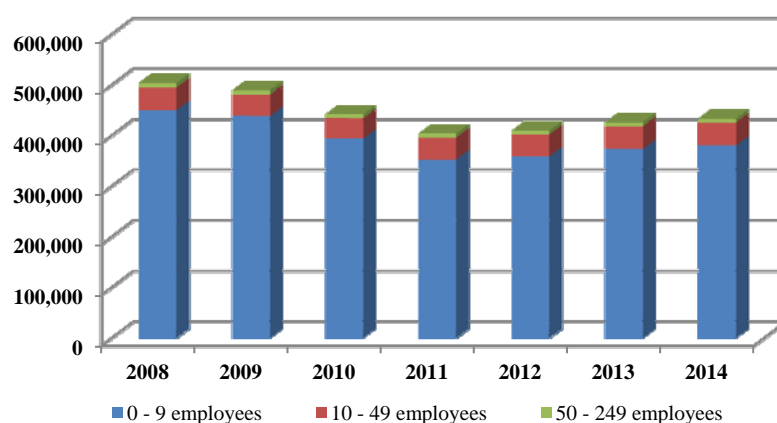
1. Introduction

Small and Medium Enterprises access to funding issue is not new, it has been a problem for long time, but it has further exacerbated nowadays, as a result of the latest financial crisis and economic downturn. It is well-known that more than 20 million European SMEs play an important role in the European economy. Besides the fact that they are major source of innovation, entrepreneurial skills and employment, SMEs provide almost 87 million jobs across the 27 member states of the European Union, representing 66.5% of all European jobs by the end of 2012 (European Commission, 2014). Micro-enterprises (almost 19 millions) have provided nearly a third of the total employment figure and generated 21% of the value added at factor costs. In Romania, more approx. 400.000 SMEs hire more than 2.5 million employees. (Figures 1-4). By the end of 2012, all EU-27 SMEs have delivered 57.6% of the gross value added generated by the private, non-financial economy in Europe. Both in emerging and developed countries, they are the most common form of business administration and lay a crucial role in the development of every national economy.

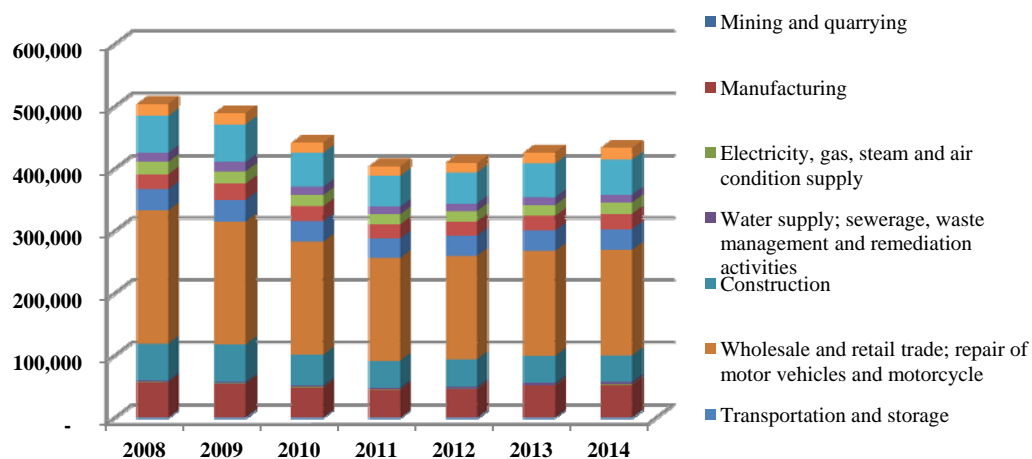
Differences among regions and countries exist, funding being not as acute in countries with solid financial systems and capital markets developed as a viable alternative. Although there is an official EU definition⁽¹⁾, practical definitions vary among countries and lenders, almost every bank having their own version of SMEs business segmentation according to their marketing strategies (Bădulescu, 2012: pp. 329-330).

Their main competitive advantages reside in innovation, flexibility and dynamism. Although SMEs are often promoters of change, support for them is very important and when it comes to access for financing, there is still much to be done, especially for innovative SMEs. During the crisis, many SMEs have confronted severe market imperfections being forced to scale back.

Figure 1. Romania's number of SMEs



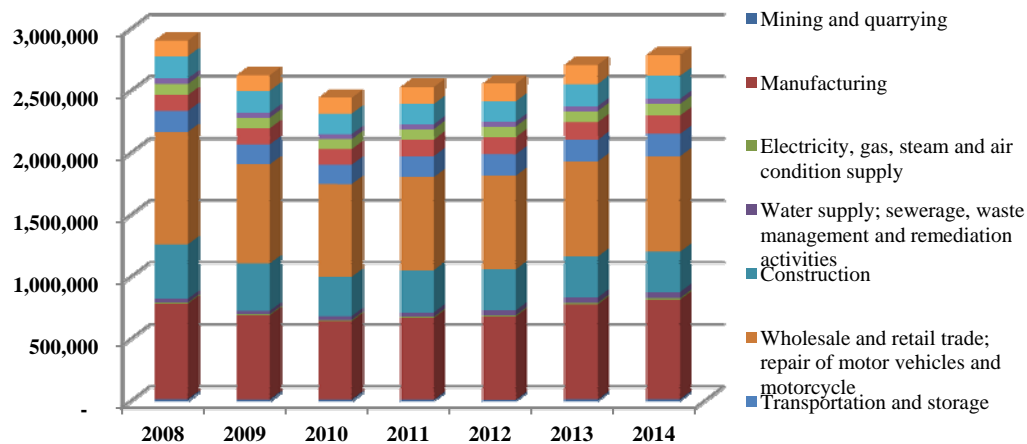
Source: European Commission, 2013-2014.

Figure 2. *Romania's number of SMEs by sectors of activity*

Source: European Commission, 2013-2014.

Figure 3. *Working employees within Romanian SMEs*

Source: European Commission, 2013-2014.

Figure 4. *Working employees within Romanian SMEs by sector of activity*

Source: European Commission, 2013-2014.

Although considered to be the backbone of the Romanian economy and probably the most reliable source of employment generation and economic growth, SME's had difficult struggles for filling the financing gap (Belanova, 2011: p. 326). Romania is one of the markets where banks do not have solid competitors (developed capital markets, private equity and venture capital industry). In this respect, banks prefer to lend money to government sector and larger, more predictable companies. Some other factors enhancing credit supply tightening could have been: low SME economic prospects, stagnation in interbank lending and increased funding costs. Banks have chosen to freeze lending to riskier companies, in order to preserve or strengthen capital base, triggering customer polarization.

2. Macroeconomic trends and business climate during crisis and post-crisis

The latest financial and economic crisis has hit millions of existing European SMEs from largest to smallest. Although the crisis has been felt in Romanian economy with a certain delay, the Romanian SMEs had to adapt gradually to the new circumstances by adopting austere and painful strategies, for instance: lay offing personnel and reducing wages to trim down administrative costs, production scale down due to modest demand, causing an overall below capacity resource utilization.

There are many factors to be found that have caused difficulties and even ceases among Romanian SMEs during the crisis, some of the most important factors being: tightening credit conditions (reduced credit supply, increased interest rates and harsher credit standards), depreciation of national currency, lower durable goods demand, massive public financing from private banks (Visinescu and Micuda, 2011) and fund redraws

from parent companies of branches present in Romania, low rates of European funds absorption, exports decline, insufficient foreign investments in strategic sectors and industries, drastic drop in demand for goods and services due to lower real income of companies and households and nevertheless increased taxes (Negoescu and Lucacs, 2010: p. 384).

Beside the crisis context, there are many “traditional” reasons arousing difficulties for SMEs accessing funds:

- Incomplete, insufficient promoted and not tailored financial solutions for SMEs needs;
- Incomplete knowledge and promotion of alternative funding schemes: mutual funds schemes, business angels, venture capital, alternative investment markets;
- Information asymmetry and moral hazard for both lenders and entrepreneurs (Popescu, 2008: pp. 98-99): the business owners may pursue riskier strategies for higher risk adjusted returns while lenders may not consider the owner’s profitability but mostly the capability of reimbursing the loans. Informational asymmetries may trigger errors in processing credit score assessment;
- Insufficient management and technical skills, neither interest to nurture corporate governance principles;
- Greater business volatility and non-regular patterns of earnings and growth, making irrelevant business track-record and financial statement history;
- Weaker financial structure and credit rating not sufficient collateral;
- Lack of corporate governance and difficulties in dividing the business objectives from its owners;
- Difficulties in scaling back activities since they are already small and less diversified;
- High transport costs due to poor railway and highway infrastructure;
- High costs for business support services (export management, business plan elaboration, hedging currency and interest rate risks);
- Lending regulations, rigid legal and tax framework, various bureaucracy barriers affecting negatively SMEs.

SMEs impeding factors for accessing funds should not be considered in isolation but as a complexity, involving economical, financial, social and cultural aspects. The access to finance depends both on quantitative factors and qualitative, some of the qualitative factors being the quality of management/owners, business planning, culture/responsibility in developing the business, reputation of the owners and the supply of equity at all stages of business development. As well, the higher collateral is, the lower the funding costs and repayment flexibility shall be. Although the most common type of guarantee asked by banks is either mortgage or gage on financed objects, banks accept widely other types of guarantees: promissory notes, collateral deposits, pladge on shares, guarantee letters, public and private/corporate guarantees. The National Fund for Guarantees and Loans for SME’s has an important role in providing guarantees to SMEs, since the guarantees letters may cover up to 80% of the credit value, have competitive fees (as a percentage

applied on the guaranteed amount) and banks prefer a mix of guarantees in order to diversify their own financial risk.

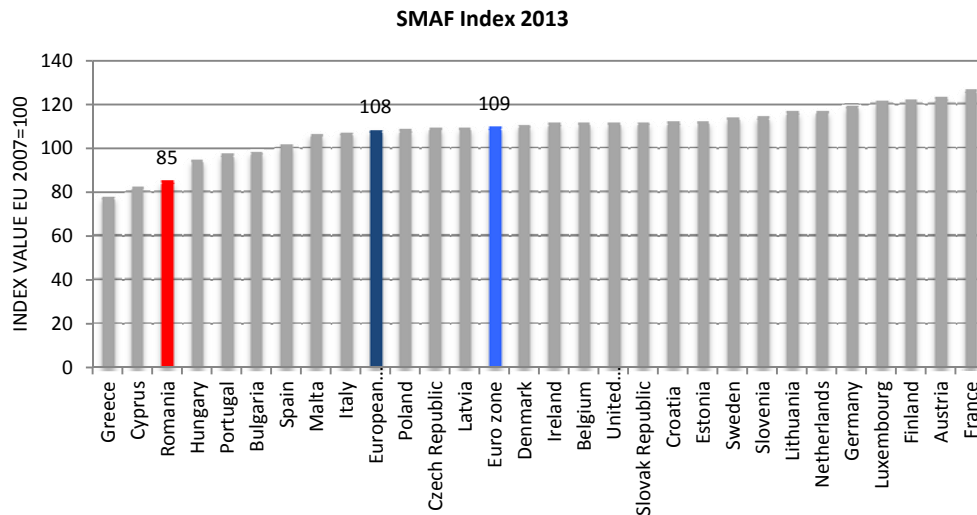
During the crisis, most of the Romanian banks have focused on anti-crisis measures like restructuring their existing portfolio rather than offering fresh funds to existing and new SMEs. Very few of them have tried to make available funds to new businesses, allowing the state and its institutions (state banks, guarantee funds) to make funds available for innovative and new SMEs. The reduction of credit supply addressed to SMEs has affected even more the Romanian SMEs because the state has borrowed money from private banks, leaving them with less money and willingness to finance the real economy. The downside evolution of the economy has influenced significantly the borrowing capacity and entrepreneur's confidence in business climate, leading to a decrease of credit demand as well (Silivestru Popescu, 2012: pp. 185-186).

Access to financing is a key factor in the development and growth of SMEs, since affects their ability to invest in the economic re-launch after such a prolonged financial and economic crisis. Governments and central banks around the world have taken important fiscal policy and monetary loosening decisions and to prevent a dramatic fall in consumption and investment, but no particular focus with sound effects on SMEs are known. Although central banks have cut interest rates and lowered reserve ratios, in most cases the lower interbank market funding costs were not fully and automatically passed to SMEs (Gjorgieva and Jovanova, 2012). On the contrary, lenders have offered fewer loans at even higher spreads in order to consolidate their financial positions as a precaution against willful neglect and default.

So far, there has been only a slow and gradual recovery of bank lending to Romanian SMEs, depending on the expectations of the improvement in overall economy, *SME Access to Finance Index* confirming this point.

The European Commission developed the SME Access to Finance (SMAF) Index to monitor developments in SMEs access to financial resources and to analyze differences between EU states. The index is calculated using a baseline of 100 related to the year 2007 at the European Union level, allowing comparison between countries and across time. The base reference of 2007 deliberately provides a baseline before the onset of the financial downturn. The index comprises two main elements or sub-indices: access to debt finance (the debt finance sub-index representing 85% of the SMAF weighting) and access to equity finance.

Although the SMAF EU Index score for 2013 is 108, indicating an improvement of 8 points comparing with the score for 2007 (France, Austria and Finland being the top performers with a score over 120), Romania is among the top 3 worst performers, ahead of Greece and Cyprus. As may be seen from the Figure 5, Romania has experienced a deterioration of the access to finance index score comparing to the original situation in 2007.

Figure 5. *SMAF Index 2013*

Source: European Commission, 2013.

3. SMEs conventional financing options

SMEs have fewer financing options although they represent an important source for growth in both emerging and developed economies. Over the last decades in both business and academic media there have been many discussions about the linkage between economy growth and capital markets as an alternative way for bank lending channel. There are many studies confirming the idea that the development level of financial markets is highly correlated with the level of the country's income per capita. To what extent do SMEs use debt, equity and alternative financing, depends on many factors like entrepreneurs' culture and attitude of business, management experience, business plan and nevertheless the supply of equity at all business stages.

The most common source of funding for European SMEs represents loans obtained from commercial banks. Over the last decade, most of the banks have designed dedicated financing solutions for SMEs, covering financing needs for day to day business activities (working capital, payments of supplies and wages), funding acquisitions (real estate/production halls, machines and equipment) and other more sophisticated funding solutions.

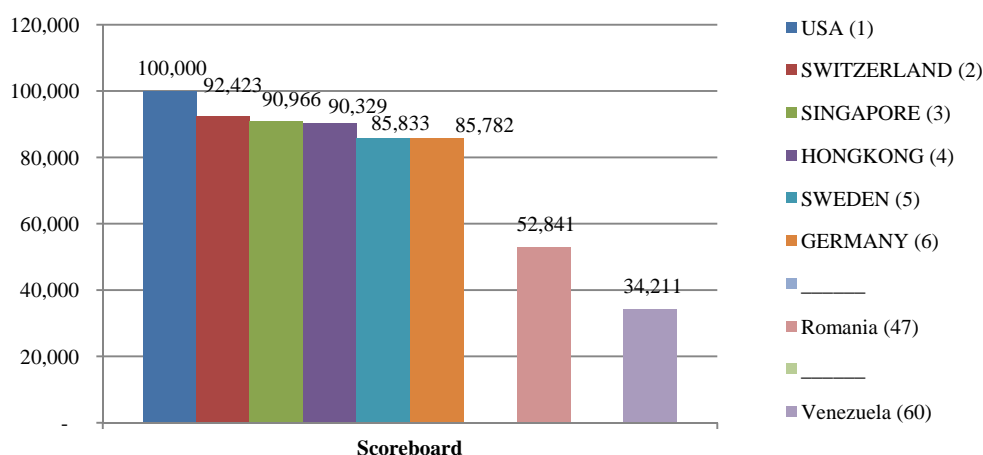
Facing with tightening credit conditions during the crisis, SME's had to explore alternative funding sources such as their own assimilated funds mobilization (owner funds, family and friends, sale of assets) and external sources, consisting of commercial paper financing (factoring, discounting, forfaiting), leasing, and raising equity, accessing grants and other risk capital sources (Daskalakis et al. 2013: pp. 97-98). Risk capital sources cover informal investments realized by business angels, venture capital and stock markets through dedicated platforms to SMEs and high growth companies (Klonowski, 2012: pp. 336).

When choosing criteria for financing, SMEs have to consider many aspects: the appropriate funding solution, the amount needed vs. fund availability, utility for accessing the money, business environment and contractual terms. They have to make their own assessment about the business opportunity and capacity for accessing and repaying the funds (eligibility conditions) and collateral needed, besides the lender's analysis.

The access to one or other funding solutions is closely related to the development stage of the enterprise. If in the pre-seed phase entrepreneurs need small amounts that may be covered from their own funds, on the early stage (start-up phase) they may need alternative funding solutions. Start-up phase is critical because it is the moment where there is most lack of funds, no bank or business angel would want to invest. Only in the first stage of development entrepreneurs may catch the attention of business angels and banks (Man and Macris, 2013: pp.312). Innovative SMEs may have even more problems. Most probably they may have negative cash-flows, new business models promoted and high initial investments needs in unconventional technologies. As business evolves, entrepreneurs gain access to tailored bank loans and alternative funds (venture capital, private equity funds private placements, mergers and listed securities).

Capital markets, venture capital and business angels are essential as an alternative way of funding to bank lending channel since banks either do not finance incipient businesses or ask for higher risk premiums, reducing business opportunities (Stancu et al., 2010, pp. 105-106). There is a considerable need for another type of relationship, personal, distinctive and genuine relationships between SMEs and banks, especially with the SMEs from areas of activity that are not the most attractive and innovative SMEs. Innovative SMEs are the ones bringing new products and services to the market, playing a crucial role in raising the region productivity and competitiveness. As may be seen from the chart no. 6, Romania ranks as the 47th most competitive economy in the world (IMD, 2014)

Figure 6. *The World Competitiveness Scoreboard*



Source: IMD, 2014.

Lacking finance for innovative SMEs could deprive the entire economy of innovative ideas. This kind of businesses are rarely conventionally financed because they need quite big initial investments and usually have negative cash flows and new business models, representing higher risk for conventional lenders. Innovative SMEs cannot be analyzed using the same conditions applied in conventional SME funding. Moreover many banks may set certain lending ceiling depending on industry/sector depending on their global marketing strategy. Large banks focus mainly on conventional data (financial information, scorings, national databases and risk assessments provided by external credit rating agencies) and collateral rather than personal and business relationships with the SMEs owners. They cherish transactional banking rather relationship banking.

4. SMEs alternative financing options

Funding facilities are essential to expand their operations, bring new solutions and create more jobs. Although they contribute significantly to growth, they often find funding much difficult and more costly than larger enterprises. Entrepreneurs shall take account of many criteria for accepting financial help other than simple cost. They need partners having strong reputation, offering support in designing business plans on one hand and on the other hand advice, training, business connections, knowhow and knowledge transfer and microeconomic assistance to access external markets.

A new trend in funding SMEs has been patterned since more and more SMEs that are not eligible candidates to access bank loans, rely on non-traditional investors (venture capital business angels, crowd funding and alternative capital market platforms) that provide capital in return for a share in the company. Alternative finance differs at different stages of business development. The owners initially seek seed finance from family and friends, business angels and venture capitalists, latter accessing specific structural and/or government funds to finish their research and development studies.

The role of business angels is very important at the early and middle stage of small business development. Business angels are persons or groups having as usual business the activity of investing capital risk in emergent and unlisted companies. They provide financing to the initial study and concept of the business. They generally invest money based on ideas and experiences the entrepreneurs have. Although the businesses they invest are very risky, most of them may never confirm expectations, few of them that survive provide incomparable higher profits.

As business grows and reach a solid business track record, business networks, initial down payment and collateral, they may seek finance from venture capitalist and private equity funds. Venture capital is essential for the development of innovative SMEs in the face of rapid growth or expansion. Both venture capital and business angels invest for a significant return at the exit. The exit represents the point where their investment is sold via capital markets, strategic investors or private equity funds. Unfortunately during the

crisis, business angels were pretty reticent as well in investing in start-ups, preferring to continue and consolidate the existing projects. Also the „usual” route preferred by the venture capital investors was difficult to be accessed without a liquid and functional capital market.

An alternative to the previous mentioned funding “sponsors” is represented by mezzanine finance - a mixture or a hybrid form of funding, between loans and owners’ equity. Mezzanine finance takes form of any subordinated debt, convertible, redeemable and preferred equity. Some companies prefer mezzanine financing, at least from the balance sheet perspective, the cost of this type of funding being lower than raising additional capital from existing investors or borrowing money from banks when loans are unavailable (Carangiu and Oltean, 2011: p. 123).

Private equity and venture capital markets have slowed down during the global economic downturn, putting pressure on prices (exit opportunities reduced) and fundraising, being specially the case of innovative SMEs and new projects investments.

5. Ways to improve SMEs access to finance

Governments worldwide play an important role in supporting innovating SMEs, particularly where conventional lenders fail to provide suitable funding support for SMEs according to their stage of development. The aim should be to ensure the efficiency of the markets (Belanova, 2011: p. 331) and to develop support schemes for private banks to assume an active role in preventing SMEs’ depletion of working capital and helping them maintain investment level towards the revival of the economy.

Government authorities, NGOs and universities should promote financial literacy among entrepreneurs and improve awareness of the many funding possibilities SMEs may have access to. It is important to be revisited as well the regulatory framework (especially for SMEs’ insolvency and reorganization) and tax systems in order to ensure a competitive, friendly and stable business environment with a low degree of bureaucracy and tax structures based more on incentives rather than obstacles.

During the crisis, the Romanian authorities have initiated some measures to support SMEs, through the financial institutions owned by the state: CEC Bank and Eximbank, providing various sources of financing as well as guarantees and counter-guarantees for existing loans granted by other banks. Public credit guarantees are among the measures most widely used and accepted in many countries, because the levels of capital requirement for a public guaranteed credit line is low, very low or even null, depending on the extent and the characteristics of the guarantee. Via guarantee funds, schemes of guarantee offered by the state banks, the authorities aim to enhance confidence of financial lenders in supporting the development of SMEs and to take over part of the risks involved directly or indirectly by the crisis.

EU community financial assistance available to Romanian SME sector represents a great opportunity to be taken by SME sector for economic recovery and it is available mainly through some of the following instruments: the European Regional Development Fund, European Social Fund and Cohesion Fund. They represent a main priority for European Commission and are meant to reduce the economic development disparities among different regions, creating new and more productive jobs, transforming less attractive regions in places for living, working and investing. EU Funds play a crucial role especially in times of economic downturn when funding is even more difficult to access. Jeremie, Jasmine and Progress represent some of the latest measures towards promoting SMEs' access to finance. Jeremie's based financing products are expected to have lower interest rates, longer loan repayment, grace periods and potentially lower collateral requirements, supporting both investment and working capital needs as well. Jasmine is an initiative which seeks to improve access to finance for small businesses and for socially excluded people, also ethnic minorities, who want to become self-employed. Progress provides microcredit to small businesses and to people who have lost their jobs and want to start their own venture.

There are a series of important steps that entrepreneurs must realize in order to get financing. Some of the most important steps relate to realizing a technical feasibility study, assess the economic benefits and costs, rates of returns, jobs and value added and both horizontal and vertical impact assessment. In order to prevent moral hazard, most of the funds require in part own contributions from the beneficiaries. Some of the most common problems identified in accessing the EU are the following: unfair practices and potential conflict of interest in awarding contracts to preferential clientele, lack of training for both entrepreneurs and institutional staff involved in the process (Beck and Demirguc 2006), lack of transparency and administrative incapacity, high fees charged by consulting firms and scarceness of co-financing funds (Marchis, 2011: pp. 448-449).

Although the range of interventions and support SMEs access to financing is non-exhaustive, the government is keen on giving a boost to all companies through various other measures:

- Reduced social insurance contributions, tax and exemptions on reinvested profits and dividends and technical unemployment;
- Export stimulating and promoting the Romanian exporters in some of the most important capitals of the world (Grecu and Cechin, 2011: pp. 59-60);
- Simplifying administrative procedures;
- Ensuring political stability and predictability of tax policies without putting SMEs at a disadvantage;
- Developing a national training program for entrepreneurs, cultivating new mentalities among population related to entrepreneurship, nurturing long term approach and unconventional financial instruments (venture capital, business angels, capital market platforms dedicated for SMEs, crowd funding);

- Developing a specialized state bank or sovereign fund (e.g. France's Strategic Investment Fund) dedicated to sustain the Romanian SMEs inside the country and abroad.

6. Conclusions

Over the last few years, we have been the witnesses of many changing paradigms related to SMEs financing. Although in theory there are a lot of financing solutions available for SMEs, practically during the crisis most of the Romanian SMEs financed their activities based on the owner's savings and very few on new bank loans and credit facilities. Even nowadays, 6 years after the bubble burst the access of Romanian SMEs to bank loans remains problematic, although there are more tailored solutions and banks accept a broader range of guarantees. This situation is mainly because banks perceive SMEs to bear more risk than larger companies, preferring to lend their money mainly to large corporates (Paulet et al., 2014).

There is a gap between the financing offer and demand. Solutions for reducing the gap may not be found without the jointly efforts of all actors: market authorities, governments, central banks, market operators, issuers and nevertheless entrepreneurs. Some steps have already been done, but there are many steps to be done in terms of creating a robust framework for SMEs financing: banks should reassess their credit scoring models and SMEs should enhance their efforts to reduce informational asymmetries, being more transparent about their current situation and development perspectives, while authorities shall have a closer approach to the real economy, committed to provide the path towards robust and sustainable growth.

Note

- ⁽¹⁾ "Micro, small and medium enterprises category (SME) is formed up by enterprises that employ less than 250 persons and have a net annual turnover up to 50 million euros and /or have total assets up to 43 million euros - definition as per Article 2 of Appendix of European Commission Recommendation no. 361/2003/CE.

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About the conceptualization of social innovation

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*“There is a perceptive need for change and, because of it,
for creation – not just punctual creation,
but creation that changes entire systems which form society.
Ultimately, no one can prove that a system works –
not in relation to an ideal, but to basic human needs.”*
(Marga, 2015)*

Abstract. *Social innovation is a relatively new analysis subject when it comes to the development of the theoretical approaches which rend the projected social development possible and efficient, but also within the context of other approaches which put emphasis on dispersed knowledge, decentralization and the capacity of communities and social groups to self-organize and formulate specific and new solutions to the issues they are dealing with. When conceptualizing social innovation there is a difficulty in transferring its common meaning, usually linked to particular science and technological cases. In this study, we propose a systematic approach of defining the concept of social innovation, from the perspective of social economy.*

Keywords: social innovation, social innovating, social reality.

JEL Classification: A2, F63.

* Andrei Marga, PhD, UBB, Cluj Napoca, Where is the creation?, *Cotidianul*, 08.05.2015.

1. Introduction

People have always been concerned with improving living conditions, with social and economic progress, a better future, a predictable future that could offer them a dignified transition through life, as well as rational answers to problems related to fulfilling their human potential.

Despite the existence of some political social norms, we cannot rely on a set of uniformly determinist laws to predict the future, nor can we pretend to have the ability to project it. It develops following the motor principle of human interaction and is the expression of the complexity of self-projection that sociality reaches through exercising its creativity.

If this hypothesis was valid in previous centuries, it is even more so nowadays, a time characterized by uncertainty, endless crisis, unprecedented technological changes and the globalization of economic markets – a world in which complexity and asymmetry can lead to events we do not wish to anticipate.

On the other hand, the future cannot be predicted as a unique and necessary reality. Societal reality, for example, is reflected by all human activities (not just economically speaking). *“Economy doesn’t say anything about family. It does not explain where we come from, nor where we’re going and why. All it promises is a better future...But is this, ultimately, the purpose of human evolution? Social relationships respond to different norms than those of economic performance.”* (Gauchet, 1995)⁽¹⁾. A limited or inaccurate vision about people can lead to significant errors in economic analysis and decision making, and thus in society.

This doesn’t mean we cannot look towards a desirable future or try to make assumptions taking the obvious risk of error; it doesn’t mean we cannot act towards fulfilling our ideals.

Although we have the tendency to take the present as reference, we shouldn’t lose sight of the fact that what actually matters is our desires, attitudes, ability to choose, risk taking and last, but not least, our past, or the things that have stood the test of time. Based on these, we can anticipate the trajectory of change, as well as the specific social constraints and galvanizing forces for or against change.

2. About social innovation

Social innovation is a relatively new analysis subject when it comes to the development of the theoretical approaches which rend the projected social development possible and efficient, but also within the context of other approaches which put emphasis on dispersed knowledge, decentralization and the capacity of communities and social groups to self-organize and formulate specific and new solutions to the problems they are dealing with.

Our approach relies heavily on social issues.

Numerous authors claim that social innovation appears as a result of a new social problem, the unsatisfying solution to a social problem or it is a way to improve existing solutions. (J. Phills)⁽²⁾ In everyday language, social innovation refers to new answers to the pressures of social demands that affect the process of social interactions. It aims to improve these answers. According to other authors, these answers span vast domains, which vary from new models of child care to online social networks; from supplying medical care to new ways of encouraging people to swap their cars for bicycles as a means of transport in the city, and developing fair trade chains globally. Recent usage of the term implies not just a new way of government and working; in traditional fields with an active involvement of society members, social innovation is an effective way to deal with issues related to climate change, social justice, aging population, etc. It is also linked to the culture of trust and risk taking, necessary to promote scientific and technological innovations.

There's a lot of hope resting on social innovation, locally, as well as nationally and globally, because existing structures and politics cannot solve some of the most pressing issues of our time. People are more and more aware that it is time to work together to find new solutions to the challenges society is facing. Social innovation has greatly increased society's willingness to cooperate and innovate. More and more governments, communities and people are concerned about the future and are trying to find viable solutions to adapt to an ever changing world, with the purpose and need to overcome poverty and solve serious issues that humanity is dealing with. Therefore one of the resources, and solution, is social innovation.

At the same time, it is becoming more obvious that the current economic model cannot offer the ideal of freedom, under the promise of which it has wasted its romantic nature. We cannot talk about freedom, like we cannot talk about equal opportunities; we are living a distorted reality which serves certain interest groups, rather than the general interest or an organic, natural evolution. If we don't act fast to solve the issues mentioned above, the consequences could be worse, costs will increase - as the present is already consuming the future and humanity risks getting out of order.

Social innovation has been the point of focus for many researchers across time. Even since the 19th century, reformers like Robert Owen, founder of the cooperative movement, have promoted innovation in the social field, and all the great sociologists, including Karl Marx, Max Weber and Emile Durkheim, have focused on larger processes of social change. Tocqueville claimed that, while family is the key component of aristocratic society, in democratic societies individuals have their own interests. He thought organizations could play an essential role in transforming democratic societies towards a progressive direction, through mediation between the isolated individual and the state.

Starting with the 20th century scientific progress regarding the theory of relativity and towards quantum mechanics has led to a paradigm modification, and innovation, a concept that had until then belonged to the world equation, was accepted as an integral, even essential part of our existence. Weber, therefore, explored the role of economy in society

and why social analysis differs from that of economists in his paper 'Economy and society' (written between 1908 and 1920). In his essay 'Objectivity of Social Science and Social Policy', Webber claims that social economy should include not only economy theory, but also historical and social economy.

Other innovation theories have become prominent in the 20th century, many of which had social implications without putting society progress at the center of the theory. Joseph Schumpeter (1934), for example, has combined the direct innovation process with his theory of creative destruction and has defined entrepreneurs as the people who combine existing element with new ways of creating a new product or service. Peter Drucker (1985) and Michael Young (founder of Open University) and numerous organizations in the 1960s⁽³⁾ were preoccupied with social innovation. These themes also appeared in the works of French writers from the 1970s, like Pierre Rosanvallon, Jacques Fournier, and Jacques Attali (Chambon et al., 1982). Despite all these debates, the pillars of conceptualizing and understanding social innovation have melted within the flood of ideological determinism that serves the power of wealth⁽⁴⁾, and gaining wealth has become the rationality behind social systems.

In this context the purpose of social innovation is no longer prosperity and wellbeing for all, but the dissolution of the social context, the loss of the critical spirit within a system that supports speculation as a source of added value. Market economy becomes market society, and the market becomes a reference for everything. Is this the societal ideal? Definitely not. Social innovation must develop from a natural, yet complex source, from searching rational solutions to structure reality, based on development principles and values - to support sustenance and sociality and to better respond to people's needs.

3. Social innovation in the EU

It is a well-known fact that the European social model is facing a profound crisis, which began in the 70s. This crisis came at the end of an intensive regime based on increasing industrial production, and as a result of intensified distribution conflicts between syndicates and patronage, and of the social movements after 1968. This coincided with the emergence of a new series of social risks (apart from the old social risks that continued to exist). Therefore, after 1980, the process of concentrating revenues and wealth has intensified, which undermined the social system, leading to social differences; but more importantly, it led to uneven development across Europe. The most affected are the ex-communist countries which are going through a major structural transformation process. These new geographical differences appear as a lag in increasing competitiveness, as a discrepancy in revenues, consumption and education. In the 2014-2020 exercise, the hope of relaunch is linked to research-development-innovation. Innovation is extremely important for future Europe's competitiveness and plays an essential role in managing the most pressing societal challenges. Social innovation is seen as a safety valve for solving local issues, and/or the issues of underprivileged groups, and

also seen as social diffusion mechanism. In EU analysis and reports, it is considered that social innovation refers to activities and innovating services which are motivated by the objective of meeting a social need, and which are scattered predominantly amongst organizations with primary social purposes.

“Social innovations are innovations that are social in both their ends and their means. Specifically, we define social innovations as new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. They are innovations that are not only good for society but also enhance society’s capacity to act. 8 The process of social interactions between individuals undertaken to reach certain outcomes is participative, involves a number of actors and stakeholders who have a vested interest in solving a social problem, and empowers the beneficiaries. It is in itself an outcome as it produces social capital.” (Agnes Hubert)⁽⁵⁾

In her opinion, taking this process into account, social innovation can be classified into *three major categories*. Firstly, *social innovations (in general) at a local level*, which respond to pressing social demands, and are not approached by the market, being aimed at the underprivileged society groups. For example, Projecto Geração (the generation project) in Portugal or the second chance in schools; France falls under this category.

Secondly, *social innovations at a larger scale which address society’s challenges*, in which the borders between ‘social’ and ‘economic’ are blurred; they are aimed at the whole society. The Red Cross and Open University are included in this category.

Thirdly, *systematic social innovations that refer to fundamental changes* in attitudes and values, strategies and politics, ICT structures and processes, delivery services and systems. Initiatives linked to making citizens more aware of climate change and recycling are some examples for this category. These social innovations, which are often initiated by institutions, play a role in reshaping society as an arena for participation where people’s ability to learn is essential. Social innovation, therefore, works towards changing society by in depth and extensive participation, towards setting inclusive organizational procedures, developing the ability of acting collectively and towards the fundamental change of attitudes and human behavior (Moulaert, 2002; Moulaert et al., 2005; Moulaert and Nussbaumer, 2008).

4. What does this concept actually mean?

The concept of social innovation seems omnipresent in today’s debates, but the reflections presented indicate significant differences in the way social innovation is understood, conceptually, but also as a social practice and action. A conciliation between views could have a major contribution towards improving the way we collaborate to find solutions with a positive impact for social development.

Academic Cătălin Zamfir (2009) shows that the difficulty in conceptualizing social innovation comes from transferring its common meaning, usually linked to particular scientific and technological instances. He suggests, as a solution, identifying the specific characteristics of social innovation, by detaching ourselves from the 'classic' cases of innovation. And this is what we try to accomplish through this study.

Innovating is a process (the action of innovating) and innovation is the result of innovating. To innovate means to make a change, to introduce something new in a field, a system, etc. There's a belief that innovation is a process, as much as a result of this process (an active, as well as passive/result form), thus creating a polysemy of the term (Azgaldov and Kostin, 2009).

Given its social attribute, in our opinion, social innovation has to be considered from a double perspective. Firstly, considering its application domain (innovation in the social field: social world, social life, social reality) and secondly, considering the characteristic given by its social condition, meaning that any innovation which happens in a social context must be interpreted through the issues against which it positions itself as an ideal solution.

From this double determination, we can conclude that social innovation is social with a double meaning, because it is applied within the social environment and because it incorporates a social aspect in itself through its definition as a form of social practice, and social knowledge and action. It is ultimately a way of manifestation for social actors. Even more so as innovation is an essential part of the reality it is born from, as a critical reflection of the social conditions of reality. This is where the important implications result from, for a practical interpretation of social innovation that cannot ignore its social descent.

Moreover, we can consider that social innovation is an external manifestation of the reality of a society, thus a social phenomenon. Durkheim demonstrates that 'when the explanation of a social phenomenon is undertaken, we must seek separately the efficient cause which produces it and the function it fulfills.' (Durkheim, 2002, p. 135). "The efficient cause" is the one that ignites change and the initiative to start or stop. (Aristotel, *Fizica* II 3) Therefore, Marx was obsessed with the role economy has in society and has developed a theory I which economy determines the general evolution of society. What leads people on a daily basis is, according to him, the material interest, and this also dictates the structure and evolution of society in general.

"In the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production. The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men

that determines their existence, but their social existence that determines their consciousness.” (Marx, 1859)

English philosopher and mathematician Bertrand Russell thought that “*the fundamental concept in social science is Power, in the same sense in which Energy is the fundamental concept in physics.*” (Russell, 1975, p. 3)⁽⁶⁾ But power is linked to politics, and politics has become, through its power, a field of action, the most important manifestation of social power. That worked while the power stuck to its mission to cover social transfers and while the individual trusted the system. Today there’s a different vision, built on neoliberal foundations after the Washington Consensus.

From these perspectives we believe that social innovation has to be considered as intrinsically linked to the social construction of reality, understood as a dialectical process in continuous movement and consisting of three stages: externalization, objectivation and internalization. “*In the dialectic between nature and the socially constructed world the human organism itself is transformed. In this same dialectic man produces reality and thereby produces himself.*” (Berger and Luckman, 2008, p. 244). An analysis of the social world which ignores any of these three moments will lead to distortions. Therefore, social innovation must follow the same dialect and ‘the new solution must produce social change, a structural, normative or regulatory cultural change in society, in R. Heiskala’s structuralist terms. (2007)”⁽⁷⁾

Social innovation is not only about social objectives; the usage of the term ‘social’ expresses the social means and refers to the development of new social relationships or to the transformation of current ones. It implies the disintegration and reorganization of existing social institution that prevent people from satisfying their basic needs, customs and consumption practices. Social innovation is not about developing and implementing technological solutions for social purposes, or about financial transfers literally. It is obvious that technological innovations can support social innovation, but only if it acts as a mechanism to transform social relationships so that excluded groups could improve their living conditions.

Therefore we think it is necessary to stir away from a functional definition of social innovation dissolved in its ideological identity, and embrace a holistic perspective of the analysis which will allow an existential understanding of innovation, and which will offer an objective interpretation at the same time, regardless of who conducts the analysis and of the historical context within which the analysis is conducted.

We have to admit that the processes in which social innovations appear, spread and succeed (or not) must be looked at individually, rather than getting confused with our common language definitions of innovation, social entrepreneurship or social enterprise. We cannot talk about social innovation when a new type of form or a new registration procedure for the beneficiaries of a public service is introduced. Social innovation must introduce a significant change in that field.

Social entrepreneurship and social enterprises have become preferred pillars for those who try to improve the world. These two are positive notions, but are not adequate when it comes to understanding and creating social change in all its manifestations (Phills Jr. et al., 2008). Authors claim that social innovation is a better vehicle to achieve this but, we add, it must be systematic, to look at large groups of people, the community or even society as a whole, not just at underprivileged categories or groups. Otherwise we stir too far away from reality, from democracy and all we achieve is to develop a fetish for reality when political democracy is already incomplete without an economic democracy⁽⁸⁾. The argument in favor of entrepreneurship and social enterprises, as a solution to actively revitalize the degree of economy, cannot be a rational one. Not in the absence of formulas that generate trust, association, fundamental and transactional interactions, a way in which social conventions form within the tangled roads of politics and governance - for prosperity, for the wellbeing of intercommunity, for the comfort we call civilization.

In this context, a holistic approach in conceptualizing social innovation thoroughly studies the conception of social innovation as a complex phenomenon, and creates the possibility of defining socio-economic megatrends in a synergistic light. These megatrends, while acting synergistically, favor and trigger the emergence (for example) of new types of strategic management, management based on knowledge that creates the possibility of shaping the configuration of the entire society, the adoption of a new vision about it, of a system in which everything is linked to circular causality, a model in which every factor influences other factors, receiving at the same time a corresponding impulse and that renders possible the interaction between theoretical models of economy and the economic reality, the management of complex systems, crisis and risks, of financial flows, competitiveness and technological development.

This is particularly important from the perspective of adopting a new economy, one based on knowledge which profoundly influences the content and the way the individual acts, this representing the way individuals socialize; it becomes a functional organ for the societal whole. A strategy based on this knowledge has as a primary component the continuous promotion of innovation, and social innovation is the true explanation for the difference in performance among societies. It is the one that creates the perspective of a holistic development of society.

In this context, we consider that: *social innovation is a process of internalizing the intension of symmetries in the configuration of reality as a system, determined by social actions of learning, sensitizing, rallying and taking action, which lead to a social change in the sense of an improvement of the current situation and of increasing the quality of life for large groups of people, for society as a whole, and which has as effect the rejection of norms and/or existing social models, and adopting a new one.*

It is a definition that encompasses the elements previously debated, without pretending to be original, but just structuring it from a sociological perspective of the concept.

5. Conclusions

It's towards this direction, in our opinion, that the conceptualization of social innovation must be stirred. It involves much more than creating a new model: it creates empathy, as well as a change in power related relationships, and a change in the way people think and act. These changes cross, invariably, the borders of the individual, group or organization. They aim to overcome the issues humanity is facing, but also to expand empathy; they target growth which is ultimately the essence of human development, as much as economic growth makes sense only if it transforms into social development. In other words, it aims to *rebuild a state as a societal state*, in which economic rationality makes sense when defined as a way of accomplishing social purposefulness in its diversity. "A heightened empathic sentiment also allows an increasingly individualized population to affiliate with one another in more interdependent, expanded, and integrated social organisms. *This is the process that characterizes what we call civilization.*" (Rifkin, 2011).

Notes

- (1) Michel Gauchet, professor at École des Hautes Études en Sciences Sociales and chief editor for *Débat* magazine, author of the renowned book *The Disenchantment of the World. A political history of religion*.
- (2) J. Phills, director of the Center for Social Innovation (www.gsb.stanford.edu/csi/) within Stanford Graduate School of Business and K. Deiglmeier (2008, pp. 36-9); M. Stewart-Weeks (2008, p. 2), C. Leadbeater (2008, p. 1), but also G. Mulgan (2006, p. 146).
- (3) Kate Gavron, Geoff Dench and Michael Young, *Quarterly 80*, Carcanet Press, London, 1995, for a holistic look at the most succesful examples of social innovation.
- (4) "85 billionaires have a combined wealth equal to that of half the world's population."
- (5) Empowering people, driving change. Social Innovation in the EU, Luxemburg: Oficiul pentru Publicații al Uniunii Europene, 2011, No. Cat. NJ-79-11-114-RO-C.
- (6) The laws of social dynamics are – so I shall content – only capable of being stated in terms of power in its various forms" (1938, 15). As a result, it is only by understanding power in all its human instantiations that we understand the social world around us. (Stanford Encyclopedia of Philosophy).
- (7) Risto Heiskala, Professor and Director, Institute for Advanced Social Research, University of Tampere social and cultural theory, historical sociology, sociology of knowledge.
- (8) Democracy is incomplete as long as it is forced to obey the owners' dictatorship (Ludwig von Mises).

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Economic models of voting: an empirical study on the electoral behavior in Romanian 2012 parliamentary elections

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Abstract. *This paper presents the results of an empirical research using data from 1276 questionnaires collected during the 2012 Romanian parliamentary elections. The goal of this research is to test some of the implications of several influential economic models of voting behavior: the calculus of voting model, the expressive voter model, the altruist voter model and the minimax regret model. Using χ^2 tests, residual analysis and logistic regression we argue that voters (instrumental or non-instrumental) deviate from the fundamental implications of the four economic models.*

Keywords: Public Choice Theory, Voting, Rational voter, Instrumental behavior, Non-instrumental behavior.

JEL Classification: D72.

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1. Economic models of electoral behavior

To analyze the models of voting briefly mentioned in the abstract, we organize them by the instrumental/non-instrumental feature of their rationality assumption and by the choice criteria they use. The obtained classes are: 1.1) models of instrumental rationality: the calculus of voting model, the altruist voting model, 1.2) models of non-instrumental rationality: the civic duty model and the expressive voting model, and 1.3) the minimax regret model. The models that fall into 1.1) and 1.2) use the utility maximization principle as choice criteria, while the model that falls into 1.3) uses the minimax regret criteria. Since this is an important methodological discrepancy, we choose to separately address this model, even though it is an instrumental rationality model.

1.1. Models of instrumental rationality

1.1a. The calculus of voting model

The calculus of voting received its mature form from Tullock (1967). In the tradition of Downs (1957), Tullock (1967) modeled voting as an instrumental act and formalized it in a simple formula⁽¹⁾: $R = pBA - C_v - C_i$. Here R is the reward that an individual receives when she votes, B is the differential benefit that the individual receives when her preferred candidate wins the elections, p is the probability of an individual bringing about the benefit B with $0 \leq p \leq 1$; C_v stands for the cost of voting and C_i represents the cost of obtaining information about electoral alternatives. Finally, A is the voter's estimate of the accuracy of her judgement. As Tullock noted, this last term is usually ignored so we will (harmlessly) also ignore it. Note that we use a simplified version of Tullock's formula: $R = pB - C$. This form captures the core of the calculus of voting model: all voters are *homo economicus*, i.e. they are utility maximizers, they are instrumental in their actions (they vote to get R), they are selfish (there is no information about the welfare of other people in their utility functions). Also, all voters know the real value of p (i.e. the probability of being pivotal in mass elections) and they are all able to estimate the costs (C) and the benefits (B) of voting. From here, if $R > 0$ then she votes and if $R \leq 0$ she abstains. Using some of Tullock's (1967: p. 110) own example, let's suppose that the value of C is 1\$, the value of B is 10.000\$ (if my preferred candidate wins the elections) and the value of A is 50% (i.e. 0.5). Suppose also that the value of p is 0,000.000.1. From here, $(10.000\$ \times 0,000.000.1 \times 0,5) - 1\$ = - 0,995\$$ ⁽²⁾. Since $R < 0$, voting is irrational. The argument in favor of this result is that its assumptions are apparently reasonable. Modern democracies generally succeed in cutting off voting costs (C) (polling stations are close enough for almost all voters, voting is organized on weekends etc.) the probability of being decisive (p) is usually very low in mass elections (as an effect of large electorates) and the individual benefits (B) of voting are rarely big enough to compensate for the interaction between the low value of p and (almost any) value of C . But if all these terms are realistic enough, it must be that the rationality assumptions used in the calculus of voting model should be scrutinized. In what follows we explore an alternative instrumental voting model which solve the paradox of voting by introducing altruism in voters' utility functions.

1.1b. The altruist voter model

The possibility of altruism had already been anticipated by Buchanan (1954) who postulated two preference scales, one purely individual and one which takes into account social values that the individual has, and contains information about other peoples' welfare. (Buchanan, 1954: p. 336). Hence, when voting, individuals may consider the welfare of the whole group. Moreover, despite grounding his model into the selfishness assumption, Downs (1957: p. 37), did not reject the operationalization of the utility maximization principle in the form of altruism. Later, Brennan and Buchanan (1984) described voters' utility function as including considerations about the welfare of other individuals simultaneously with non-instrumental aspects. However, a fully developed model of altruistic voting can be identified only with the works of Andreoni (1990) – Jankowski (2002). Andreoni (1990) analyzed two types of altruism, pure altruism and warm-glow altruism⁽³⁾. Later, Jankowski (2002) included these two types of altruism into a new equation of voting: $U_i = \frac{p[B_1+B_2]}{2} - C + D + W$, where p is the probability of casting the decisive vote, B (the total benefit of voter i) is the sum of her purely selfish benefit (B_1) and her purely altruistic benefit (B_2), W is voter's private benefit when she supports some transfer by voting (warm-glow altruism) and D is a term introduced by Ordeshook (1968) which refers to non-instrumental motivations. Edlin, Gelman and Kaplan (2007) proposed a similar way of constructing the B term. Their formula was $B = B_{ego} + \alpha B_{soc}$ where B_{ego} is voter's selfish benefit, B_{soc} is her altruistic benefit and α is a discount parameter capturing the intuition that B_{soc} is a fraction of B_{ego} (in other words, I derive more utility from my selfish benefit than from my altruistic benefit). Starting from this construction of B the equation of voting was the same as in the calculus of the voting model: $R = pB - C$. The structure of these two altruistic voting models is not the same. In the first case (Jankowski) voters' motivations are both instrumental (B_1, B_2, C) and non-instrumental (D, W). In the second case (Edlin, Gelman, Kaplan) voters' motivations are purely instrumental. Despite these difference though, what is common to these models is the fact that all voters know the true value of p and that they all have the ability to accurately estimate the values of B and C .

1.2. Non instrumental rationality models

Downs (1957, p.48) originally noted that the elections could be seen as devices for expressing preferences⁽⁴⁾. Tullock (1967: p. 101) also mentioned that non-instrumental motivations are important for explaining why some individuals gather information in order to vote. Despite these suggestions, an explicit attempt to introduce a non-instrumental factor into the equation of voting appears in Riker and Ordeshook (1968). Their form of voting equation was $R = pB - C + D$, where the last term – the non-instrumental one – D , could have, as Riker and Ordeshook (1969: p.28) noted, several meanings: the satisfaction from compliance with the ethic of voting, the satisfaction from affirming allegiance to the political system, the satisfaction from affirming partisan preference, the intrinsic satisfaction of deciding, going to the polls etc., the satisfaction of affirming one's efficacy in the political system. Hence, D is the set of all non-instrumental factors that could affect voting. In their (1968) paper, the authors insist upon

the first meaning of the term, civic duty. The second meaning received more attention from Fiorina (1976) and then from Brennan and Buchanan (1984), Brennan and Lomasky (1985). Brennan and Buchanan (1984) added an explicit non-instrumental term (V), to the voters' utility function: $U_i = U_i(X_i; G; X_j; V \dots)$. Here, U_i , the utility of the individual i , depends on her consumption of private goods (X_i), on the level of public goods provision (G), on other individuals' consumption level of private goods (X_j) and on the non-instrumental factor – the intrinsic consumption of voting (V), conceived as the opportunity to express partisan preferences. This (V) component was further studied by Brennan and Lomasky in an alternative understanding of voting as means to express moral sentiments⁽⁵⁾. In the first version (expressing partisan preferences) voting is seen as cheering and booing at a sports event. In the second version (expressing moral sentiments) voting is conceived as an opportunity to express support for certain values. Both versions share the basic underlying assumptions: voting is conceived as a consequenceless act – all voters know the value of p (which in mass elections is very low), they all accurately estimate the values of B și C , *i.e.* they are able to estimate the costs and benefits of voting. Moreover, all voters accurately estimate the value of D (no matter it refers to expressing moral sentiments, civic duty or other moral sentiments). This last aspect is essential to the capacity of the model to solve the paradox of voting, since the role of the D term is to cancel out the effect of non-participation produced by the instrumental terms.

1.3. The minimax regret model

An interesting solution which avoids the paradox of the calculus of voting is to replace the utility maximization principle with another choice criterion, the minimax regret (Ferejohn, Fiorina, 1974). In a simple presentation the minimax regret criterion states that for any pair of actions⁽⁶⁾ a_i and for any states of the world s_j , the individual is able to compute the regret r_{ij} defined as the difference between (1) what the individual could have obtained in s_j provided she had perfect information about the results and chose the action with the maximum benefit and (2) what the individual obtains choosing a_i . This implies that for any action, individuals compute the maximum possible regret $\max_j r_{ij}(s_j)$ choosing that action which is the *minimum* of these *maximum* regrets (*i.e.* minimax regret). This decision criterion does not take into account the likelihood that the 'worst result' will materialize but refers only to the possibility of that outcome. Applying this decision criterion to the issue of voting, the prediction is that turnout will be higher than the calculus of voting model implies. The main reason for this result which is (more) consistent with observable facts is that, in the event that the preferred candidate would lose by one vote, the regret experienced by the individual who chose not to vote, will be very high. Hence he has (instrumental) incentives to minimize his maximum possible regret⁽⁷⁾. Even though this model assumes that the probability of being decisive p is irrelevant, the basic structure of the model shares some elements with the above reviewed models. Minimax regret voters are also able to accurately estimate the values of B and C . Moreover, voting is conceived as an instrumental act and voters are seen as selfish agents (even though the minimax regret framework is consistent with selfless individuals⁽⁸⁾).

2. Methodology

The research uses data collected from a questionnaire applied during the Election Day of 2012 Romanian parliamentary elections. In building the questionnaire we aimed to identify anomalies (relative to the models reviewed above) of the preferences or of the subjects' state of knowledge. For instance, as pointed out in the first section of this paper, all the models assumed that voters are able to judge voting in terms of its costs and benefits – they are able to accurately estimate the values of C and B . Voters also (in the case of the models presented at 1.1a, 1.1b and 1.2) know the value of p – they are aware of the unlikeliness of their pivotality in mass elections. The questionnaire aims to identify the empirical support of each of these common elements⁽⁹⁾, without ignoring the details of each model. The basic intuition of this research was that voters have multiple incoherent motivations and that the uniformity⁽¹⁰⁾ assumed by all these models is not empirically founded.

The questionnaire was applied on the day of the Romanian parliamentary elections, on the 9th of December 2012 (outside the polling stations). Summed up, there were 1276 questionnaires applied in the following locations: Bucharest (one polling station in district 1 and 1 in district 4), Conțești and Răcari – Dâmbovița county (all polling station), Fierbinți and Axintele – Ialomița county (all polling stations), Glodeanu Siliștea – Buzău county (all polling stations). Obtaining a representative sample was impossible, given the difficulties in characterizing the total voting population. However, the sample size is quite varied in terms of respondents' socio-demographic characteristics, as shown in the charts below.

Figure 3.1. Gender distribution

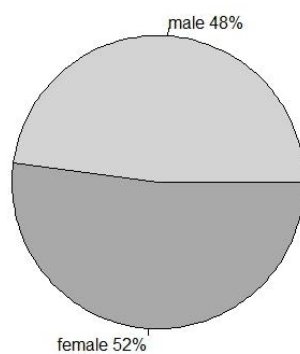


Figure 3.2. Age distribution

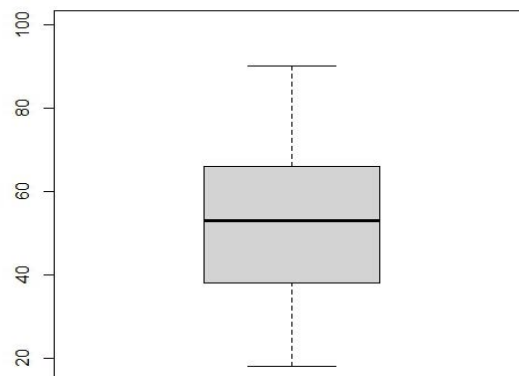


Figure 3.3. Education distribution

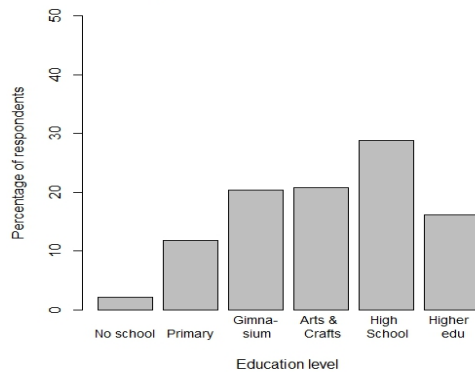
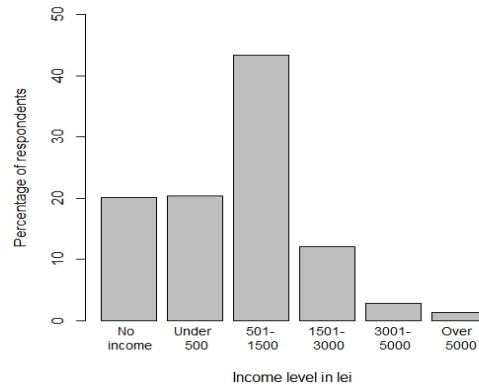


Figure 3.4. Income distribution



In order to analyze the data, respondents were first classified into instrumental and non-instrumental voters, based on an open question about their reasons for deciding to vote. Subsequently, the instrumental category was divided into selfish and altruistic voters⁽¹¹⁾. Building this typology of respondents was required by the need to study the correlation between voter's type and the respondent's perception of his probability of being decisive. This classification was necessary in order to allow us to study the extent to which the type of voter, determined by the voter's own declared motivation, is correlated with the voter's perception of the probability of being decisive, as well as the perception of the costs and benefits of voting. We also analyzed the association between the type of voter and the odds of having taken into account the regret hypothesis when having decided to vote.

We have used χ^2 tests for our analysis. These tests treat all variables as nominal and study the association between the variables in the analysis. Following the test, we have also done a residual analysis, because for variables with at least three categories, χ^2 tests can only indicate association without being able to indicate the categories between which this association exists. Based on the standardized difference between the observed and expected frequency, the residual analysis indicates the intensity of the association between the categories of two variables as well as the type of association. The type of association refers to a positive or negative relation between variables⁽¹²⁾, however, in the case of nominal variables by association we mean a higher or lower probability of finding a response in one particular category of one variable, given the response category on the second. For example, if we study the association between women and voting for party A and discover a positive association, then we expect the probability of voting for A to be greater for women rather than men. If the association had been negative, then the interpretation would have been the other way around: men would have had a higher probability of voting for A than women.

The analysis also included a logistic regression. The purpose of the analysis is to determine whether the type of voter can be explained and predicted on the basis of the perception of costs, benefits and odds of the voter being decisive and also to determine the extent to which these voter profiles correspond to the theoretic predictions of the voting models described in section II of this paper.

3. Results

3.1. Analysis of association

The association analysis depicted in the table below, tests whether there is a significant association between the perception on the odds of being decisive [P], on costs[C], on benefits [B], on the regret hypothesis[R] and the type of voter. The type of voter has been operationalized either as being instrumental or non-instrumental, or as being instrumental egoist, instrumental altruist or non-instrumental. The perception on decisiveness [P], costs[C], benefits [B] and regrets[R] have been operationalized by two questionnaire questions each, as indicated in the table below by the letter in rectangular brackets at the beginning of each question. χ^2 tests and residual analyses have been run for each of the questions below and the type of voter.

Table 1. Residual analysis of χ^2 tests, between voter type and different independent variables

		χ^2	Non instrumental voters	Selfish voters	Altruist voters
[P]Before voting, has it ever occurred to you that without your vote your favorite candidate might lose the elections?	YES	16.701 (df=2, p=0.000)	-4.035	2.36	1.5
	NO		4.035	-2.36	-1.5
[C]Has it ever occurred to you that voting implies effort on your behalf?	YES	7.178 (df=2, p=0.000)	-2.278	-0.244	2.366
	NO		2.278	0.244	-2.366
[C]To what extent did you alter your plans in order to be able to vote today?	1(Not at all)	34.15 (df=8, p=0.000)	1.61	1.18	-2.65
	2		2.27	-1.79	-0.40
	3		1.59	-1.83	0.27
	4		-3.19	1.84	1.22
	5(To a very large extent)		-3.44	0.11	3.12
[B]Do you expect to be better off if your favorite candidate/candidates win?	YES	37.45 (df=2, p=0.000)	-6.09	2.21	3.51
	NO		6.09	-2.21	-3.51
[R]Have you taken into account this possible regret before coming to vote?	YES	1.25 (df=2, p=0.53)	0.94	-0.94	0.03
	NO		-0.94	0.94	-0.03
[B]I will be better off if my favorite candidate wins	1(Not at all)	58.58 (df=8, p=0.000)	4.70	-2.01	-2.43
	2		2.80	-0.004	-2.60
	3		3.16	-1.088	-1.89
	4		0.63	-0.40	-0.199
	5(To a very large extent)		-6.32	2.10	3.85
[P]To what extent do you agree with the following: "It doesn't make much difference if I personally go and vote, because so many people vote in elections"	1(Not at all)	18.73 (df=8, p=0.01)	2.04	0.5	-2.39
	2		1.32	-1.42	0.13
	3		0.79	-0.05	-0.68
	4		-0.99	-0.84	1.74
	5(To a very large extent)		-3.45	1.02	2.24
[R]Let's imagine that you had not voted today and your favorite candidate would have lost the elections by one vote. On a scale from 1 to 10, where 1 means "not regret at all" and 10 means "strongly regret", please advise the extent to which you would regret your decision to refrain from voting.	1 ⁽¹³⁾ (Not at all)	28.17 (df=18, p=0.05)	1.32	-0.19	-1.05
	10 (To a very large extent)		-4.028	1.67	2.17

The χ^2 tests reveal a significant association between the perception on decisiveness and the type of voter. Unlike non-instrumental ones, the egoist voters tend to believe that without their vote their favorite candidate might lose. Although there is no significant relation for altruist voters (residuals are smaller than 2), when egoist and altruist voters are considered together, as instrumental voters, the analysis indicates a stronger association between the variables. On the other hand, instrumental altruist voters tend to believe it is not important to take part in mass elections because of how many people vote, while non-instrumental voters think it is still important to participate. Thus, it seems that non-instrumental voters do not think in terms of probability, while instrumental ones do, but are unable to correctly estimate it.

As far as costs go, there is a moderate positive association between instrumental voters and the perception of effort and a negative one for the non-instrumental (residuals of 2.28 in absolute value). However, for instrumental voters, the relation only holds in the case of altruist ones. Also, it is more likely that instrumental altruist voters have indicated altering their plans to vote, in comparison to non-instrumental ones. Thus, instrumental voters seem more likely to perceive the costs of voting but are also likely to be willing to suffer these costs, while non-instrumental ones do not seem to perceive them at all. Regarding the perception on benefits, there is a strong positive association between instrumental voters and the belief that their favorite will improve their own livelihood and that of the society as a whole. However, the relation does not hold for egoist voters when asked about the livelihood of the society. This might be because egoist voters do not include in their utility function the benefits for the rest of the society, while altruists do. As for regret, although instrumental voters would be more likely to regret having abstained if their favorite would have lost by one vote, there is no association between the type of voter and having taken this kind of scenario into account when deciding to go and vote in the general elections of the 9th of December.

In conclusion, the association analysis indicates significant differences between instrumental and non-instrumental voters in terms of the perception of decisiveness, costs and benefits, with instrumental voters being more likely than non-instrumental ones to make voting in terms of probability of being decisive, costs and benefits, although they also seem likely to overestimate the decisiveness probability and the benefits of having their favorite win.

3.2. Regression analysis

The results of this analysis are limited to indicating the extent to which, each of the variables is associated with a voter type. However, the association analysis between two variables does not control for the effect of the rest of the variables on the relation. Furthermore, this type of analysis does not account for the most influential factor for the characterization of the voter. Which of the three factors, the perception on the odds of being decisive, on the costs or on the benefits, carries the greatest weight when being used to predict the type of voter? In order to be able to answer such questions, a regression analysis is necessary. We have chosen to run a logistic regression model, where the dependent variable is dichotomous and refers to the type of voter which can be

either instrumental or non-instrumental⁽¹⁴⁾. The independent variables included in the study are as follows:

- frequency of past voting, with three response categories (*nearly every time, occasionally and never before*) which has been converted in two dummies (*every time and occasionally*) and choosing “*never before*” as the reference category;
- a dummy variable taking 1 for respondents who have taken into account the probability that their favorite would lose without their vote (*loss*);
- a dummy variable taking 1 for respondents who consider voting to involve effort (*effort*);
- an ordinal variables referring to the extent to which the voters have changed their plans in order to be able to go and vote (*plans*), with 5 response categories, where 5 means “to a very large extent” and 1 “not at all”;
- a dummy variable which takes 1 for respondents who believe that their livelihood will improve if their favorite wins (*improvement*);
- a nominal variable regarding the voters’ decision to continue to vote for their favorite, to vote for someone else or not to vote at all, when the expected vote difference in favor of some other candidate than their favorite is large. We have chosen the decision to abstain as the reference category and have transformed the two other categories in dummies (*the same, another*);
- an ordinal variable with 5 steps which accounts for the respondent’s agreement with the statement that too many people vote in elections, so no individual vote matters (*it matters*).

Table 2. Regression results

	Coefficients	Standard Error	Z score	Pr(> z)
intercept	-0.91	0.74	-1.22	0.22
every time	0.54	0.66	0.81	0.41
occasionally	-0.02	0.72	-0.03	0.98
loss	0.36	0.18	2.05	0.04 *
effort	0.09	0.19	0.48	0.63
plans	0.11	0.05	2.01	0.04*
improvement	1.11	0.24	4.64	0.00 ***
the same	-0.48	0.31	-1.55	0.12
another	-0.43	0.43	-0.99	0.31
it matters	0.11	0.05	2.34	0.02 *
Level of significance: 0 ****, 0.001 ***, 0.01 **, 0.05 ., 0.1 ' , 1				

The purpose of the regression analysis was to determine the conditions under which the probability of classifying a voter as instrumental or non-instrumental increases. Four independent variables have significant impact on the outcome: *loss*, *plans*, *improvement* and *it matters*. In comparison to non-instrumental voters, the instrumental ones have 44.33% more chances of believing that their favorite might lose without their vote, 11.62% more chances of changing their plans in order to vote and 2 times more chances of believing that their livelihood will improve if their favorite wins. At the same time, instrumental voters have 11.62% more chances of believing that it makes a difference if

you decide to take part in mass elections. The result is surprising and inconsistent with the predictions of the association analysis between the two variables. On the other hand, for both categories of voters, the median has the values of 1-“not at all”. In other words, at least half of the respondents in each category reject the affirmation. Although it is more likely that instrumental voters would be in agreement with the affirmation, the probability of being in agreement to a large extent is quite small in all cases.

4. Conclusions

The purpose of this study was to test some of the implications and assumptions of some of the most influential economic models of electoral behavior in the context of the Romanian 2012 general elections. The conclusions of the association and regression analyses indicate that, based on their own motivation for going to vote, the respondents can be categorized in at least two categories: instrumental and non-instrumental. This distinction is also backed up by the respondents' perception of the probability of being decisive, of the costs and the benefits of voting. Instrumental voters tend to overestimate the odds of being decisive to a larger extent than non-instrumental ones. At least half of both categories believe that it is important to vote, but only instrumental voters believe that their favorite candidate might lose without their vote. Although only instrumental voters perceive the costs of voting, they also seem to be the ones willing to assume these costs, as they are the ones who declared having changed their plans in order to be able to go and vote. Instrumental voters also believe that their livelihood will improve if their favorite candidate wins. Instrumental voters seem to think of elections in terms of costs and benefits, perceive the costs and believe them to be quite high, but at the same time tend to overestimate their odds of being decisive. Therefore, if they were driven by instrumental motivations to vote, this is due to their inability of correctly estimating the value of p . On the other hand, non-instrumental voters tend to correctly estimate p , but they do not seem to perceive the costs and benefits of voting. They believe voting to be effortless and have not had to change their plans in order to vote, but do not believe that their life will improve should their favorite win. In conclusion, both categories break the voting models' assumptions, as the models are built on the voters' capacity of correctly estimating p , C and B . The same conclusion applies to the regret model, which is based on the voters' ability to estimate C and B .

Notes

- (1) The notations are different from those used by Tullock (1967). In this form they are consistent with the notations frequently discussed in the public choice literature.
- (2) If we give up to A , as mentioned above, the obtained value is incrementally higher, but the prediction is the same $R < 0$: $(10.000\$ \times 0,000.000.1) - 1\$ = - 0,999$.
- (3) The difference between pure altruism and warm-glow altruism is that the pure altruist is invariant to the donors' identity, while the warm-glow altruist extracts utility from charity only if he is the donor. In other words, in the first case what it is important is the benefit received and not

the identity of the donor, while in the second case the donor's identity it is all that matters, irrespective to the receiver's welfare level.

- (4) ... but he argued in favor of conceiving voting as instrumental to discriminate between alternative governments.
- (5) As Kan, Yang (2001: p.297) and, Mueller (2003: p. 321), have shown, expressive voting was modeled into these two versions. Regarding voting as expression of moral sentiments it may be noticed its equivalence with Andreoni-Jankowski's warm-glow altruism (Hamlin and Jennings, 2011: p. 654).
- (6) This presentation follows Dhillon, Peralta (2002: p. F337).
- (7) Essential for the understanding of this model is Beck's (1975) (anecdotal) remark that "one should never cross a street to buy a newspaper" (Beck, 1975: p. 918).
- (8) The argument can be extended by including considerations about other peoples' welfare. In this case the voter would include the utility of other individuals in his computation of maximum regret.
- (9) Moreover the existence of these common parts presents an opportunity – it facilitates simultaneously testing several models' implications and assumptions.
- (10) In the sense that all these models assume that voters uniformly know the value of the p, B, C terms.
- (11) Where it was impossible to distinguish between an egoist and an altruist voter, the categorization has been done randomly. The reader must keep in mind that altruism was only considered in its instrumental version. Please see note 11 above.
- (12) A positive association between two variables would imply that while the values of one variable increase, the values of the other should increase as well. For example, as the level of education increases, we expect the corresponding income to increase too. A negative association on the other hand would mean that while the values of one variable increase, the values of the other should decrease.
- (13) In order to limit the table's dimensions, we will only report the residuals for categories 1 and 10.
- (14) We have chosen to use the dichotomous classification of the voters, in instrumental and non-instrumental ones, given the fact that the association analysis has always returned significant results between all the independent variable and this classification. When dividing instrumental voters in egoists and altruists, the association sometimes is not significant.

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Revisit Export and GDP Nexus in China and Taiwan: A Rolling Window Granger Causality Test

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Abstract. *This paper re-examines the causal link between export and economic growth for both, China and Taiwan, using a rolling window Granger causality test over the 1980Q1-2013Q3 period. Our empirical results based on full-sample Granger causality test find evidence of feedback between export and economic growth for both China and Taiwan. However, results from our parameter stability test indicate that there is instability in our VAR model. We doubt these results might be misleading due to instability in our VAR model and these motivate us to use the bootstrap rolling window estimation to investigate the export and economic growth nexus which accounts for the time varying causal link between these two variables. Our empirical results from rolling window Granger causality test indicate that export growth did Granger cause economic growth in some certain periods, 1984Q4-1985Q2 and 1989Q2-1990Q1 for China and no relationship for Taiwan. On the contrary, economic growth also Granger cause export growth in some periods, 1987Q4-1988Q1, 1989Q1-1989Q2, 2009Q3, and 2013Q2-2013Q3 for China and 1984Q4-1985Q1, 1989Q4, and 2008Q3 for Taiwan. Our empirical results have important policy implications for both China and Taiwan.*

Keywords: Export Growth; Export Growth; Rolling Window Granger Causality Test; China; Taiwan.

JEL Classification: C32; C53; E32; F43; O51; O52.

1. Introduction

Over the past several decades, empirical studies have devoted increasing attention to the relationship between exports and economic growth. Whether exports promotes or is neutral with respect to economic growth is central to the debate about their relationship. However, despite voluminous research, empirical results remain mixed and inconclusive, making impossible to generalize the relationship across countries and over time.

There are at least four views regarding the nature of the relationship between exports and economic growth. The first is the export-led-growth hypothesis, which implies a one-way Granger causality from exports to economic growth, where exports can promote economic growth. If there is a unidirectional Granger causality from exports to economic growth, with increases in exports leading to increased economic growth, then the effect of exports on economic growth is positive, as exports may stimulate economic growth through Keynesian-type aggregate demand effects. Specifically, an increase in demand generated by higher exports can provide foreign exchange that allows for more imports of intermediate goods, which in turn raises capita formation, higher employment, and profits. This further increase in higher investment will further stimulate economic growth (Krueger, 1978; Ram, 1985). The second hypothesis regarding the relationship between economic growth and exports proposes the opposite causality, running from economic growth to exports, with economic growth inducing increased exports rather than the other way round. If causality running from economic growth to exports and this means that with increases in economic growth will cause increases in exports. This growth-led-exports hypothesis is argued by economists like Krugman (1984) and Lancaster (1980); who advocate that economic growth leads to enhancement of skills and technology, and with this, increased efficiency, thereby creating a comparative advantage for the country that facilitates exports. The third view is the feedback hypothesis, which propose a two-way Granger causal relationship between exports and economic growth and thus that exports and economic growth are mutually determined. Such interdependence suggests that policies that limit the growth of exports may negatively affect economic growth and, conversely, that a reduction in economic growth can be negatively transmitted back to exports. The reason for a feedback is that exports may rise from the realization of economies of scale due to productivity gains; the rise in exports may further enable cost reductions, which may result in further productivity gains (Helpman and Krugman, 1985). The fourth view is the neutrality hypothesis of no causality in either direction between exports and economic growth. This view implies that increased exports may not affect economic growth and both exports and economic growth may be determined by other unrelated variables (for example, investment) in the economic system (Pack, 1988). As these four different hypotheses have different policy implications, knowledge of the causal relationship between exports and economic growth is crucial to devising appropriate exports strategies and policies. As noted by Lim and Ho (2013) that trade theory does not provide definitive guidance on the causal relationship between exports and economic growth. Also, it remains as unsolved problem for policy makers that should promote exports to speed up economic growth or should focus on economic growth to create more exports?

This study revisits the causal link between exports and economic growth for both China and Taiwan over the period of 1980Q1 to 2013Q3, using a rolling window Granger causality test. To the best of our knowledge, this is the first study that uses a rolling window Granger causality test to study the relationship between exports and economic growth for both Taiwan and China. While previous studies using time series VAR model without taking into account the possibility of parameters instability, the results might be misleading due to the ignorance of structural breaks. Our paper makes a contribution to the existing literature by taking into account the time variation in the causal links between exports and economic growth with bootstrap Granger non-causality test and rolling-window sub-sample estimation. Empirical literature examining causality between these two time series may suffer from inaccurate results when the underlying full-sample time series have structural changes as pointed by both Balcilar et al., (2010) and Balcilar and Ozdemir (2013). In the presence of structural changes, the dynamic links between the two series will show instability across different sub-samples (Balcilar et al., 2010; Balcilar and Ozdemir, 2013). We can address this by allowing the causal relationship between the two series to be time-varying instead of using full-sample data that assumes the single causality holds in every time period. The time-varying nature that may exist in the causal link between exports and economic growth for both China and Taiwan has been taken fully into consideration in this paper by using bootstrap sub-samples rolling window estimations. Instead of just testing for causality on the full-sample which assumes a permanent causal relationship, we also test for causality on the rolling sub-sample with a fixed-size window, thus allowing us to capture structural changes in the model and the evolution of causality between sub-periods. In light of this, our paper is starkly different from the existing literature which, in general, only considers full-sample causality, and unlike our study is susceptible to misleading results and conclusions in the presence of parameter instability due to structural breaks in the relationships. Finally, we hope that this study can bridge the gap of the current literature in export and economic growth.

The plan of this paper is organized as follows. Section 2 briefly describes the data used in this study. Section 3 outlines the econometric methodology employed. Section 4 reports our empirical findings and some major policy implications are also reported. Finally, Section 5 is devoted to concluding remarks.

2. Data

This empirical study uses quarterly data for both China and Taiwan over the period 1980Q1-2013Q3. The variables in this study include total real export (*REX*) and real GDP (*RGDP*). *RGDP* and *REX* are expressed in terms of billions of Chinese Yuan for China (2005=100) and millions of New Taiwan dollars for Taiwan (2006=100). The source of the data is from the AREMOS Database, Ministry of Education of Taiwan. Summary statistics of both *RGDP* (growth rate) and *REX* (growth rate) for both China and Taiwan are reported in Table 1. We can see that China has higher growth rate for both *RGDP* (0.003148) and *REX* (0.004864) than those of Taiwan (0.001452 and 0.000944, respectively for *REX* and *RGDP*). The Jarque–Bera (J-B) normality test results indicate that the growth rate of both *RGDP* and *REX* for both China and Taiwan are approximately no-normal.

Table 1. *Summary Statistics of China and Taiwan data (Percentage change on previous period (LN%))*

Countries	China Export	China GDP	Taiwan Export	Taiwan GDP
Mean	0.004864	0.003148	0.001452	0.000944
Median	0.004335	0.002906	0.001304	0.000881
Maximum	0.039829	0.014524	0.013738	0.003894
Minimum	-0.021741	-0.00476	-0.01356	-0.00347
Std. Dev.	0.009524	0.002529	0.003102	0.001197
Skewness	0.346816	1.087037	-0.34327	-0.34773
Kurtosis	4.665071	9.118572	7.598706	4.088208
Jarque-Bera	18.16586	235.413	120.7086	9.312159
Probability	0.000	0.000	0.000	0.000

Note: The sample period is from January 1980:Q1 to 2013:Q3. China Export and GDP (in Billions of Chinese Yuan) and Taiwan Export and GDP (in Millions of New Taiwan Dollar).

3. Methodology

3.1. Unit Root Test and Cointegration Test

Many macroeconomic time-series contain unit roots (dominated by stochastic trends) (see Nelson and Plosser, 1982). Unit root tests are important in examining the stationarity of a time series because the presence of nonstationary regressors invalidates many standard hypothesis tests. Granger and Newbold (1974) have found by simulation that the F-statistic calculated from a regression involving nonstationary time-series data does not follow the standard distribution. The actual distribution is nonstandard and, compared to the standard distribution, has a substantial rightward shift under the null hypothesis of no causality. Consequently, the significance of the test is overstated and a spurious result is obtained. The presence of a stochastic trend is determined by testing the presence of unit roots in time-series data. Several tests for the presence of unit roots in time-series data have appeared in literature (see, for example, Dickey and Fuller, 1979, 1981; Phillips and Perron, 1988, and Kwiatkowski et al. 1992). In this study, unit roots are tested for using both the Augmented Dickey–Fuller (ADF) and the Kwiatkowski et al. (KPSS) tests. In order to fully investigate the stationary property of each variable, we first apply three conventional unit root tests – ADF, PP and KPSS tests to examine the null of a unit root in both RGDP and REX for China and Taiwan. We select the lag order of the test on the basis of the recursive t-statistic, as suggested by Perron (1989).

Once a unit root has been confirmed for a data series, the question is whether there exists some long-run equilibrium relationship among variables. If this is the case, then estimating a multivariate time-series model using only first differences of the series could result in a serious misspecification since important level terms will have been omitted (Engle and Granger, 1987 and Engle and Yoo, 1987). The existence of a long-run equilibrium relationship among economic variables is referred to literature as cointegration. Johansen and Juselius (1990) propose two test statistics for evaluating the number of cointegrating vectors: the trace (Tr) and the maximum eigenvalue (L-max) statistics. It is well known that the JJ cointegration tests are very sensitive to the choice of

lag length. The Schwartz Criterion (SC) is used to select the number of lags required in the cointegration test. A VAR model is first fit to the data to find an appropriate lag structure.

3.2. Granger Causality Test based on Full Sample

The purpose of our study is to analyze the causal relationship between exports and economic growth for both China and Taiwan. We thus make use of the Granger non-causality test in the bivariate VAR framework proposed by Balcilar et al. (2010). In general terms, standard causality test statistics for joint restriction and standard asymptotic properties include the Wald, Likelihood Ratio (LR) and Lagrange Multiplier (LM) statistics. However, according to Sims et al. (1990) and Toda and Phillips (1993, 1994), when the underlying time series data in levels estimation of VAR models is non-stationary, these test statistics may not have standard asymptotic distributions. Toda and Yamamoto (1995) propose a modified Wald test by estimating an augmented VAR model with I (1) variables to obtain standard asymptotic distribution for the Wald test. However, Shukur and Mantolos (1997b) use Monte Carlo simulations to show that the modified Wald test does not have correct size in small and medium size samples. Nevertheless, Shukur and Mantolos (1997a) suggest that improvement (in terms of power and size) can be achieved by using the residual based bootstrap (RB) method critical values. Moreover, the excellent performance of the RB method over standard asymptotic tests, regardless of cointegration or not, has been confirmed in a number of Monte Carlo simulations studies (Mantolos and Shukur, 1998; Shukur and Mantolos, 2000; Mantolos, 2000; Hacker and Hatemi-J, 2006; Balcilar et al., 2010). Especially, Shukur and Mantolos (2000) prove that small sample corrected LR tests exhibit relatively better power and size properties, even in small samples. As a consequence, based on these findings, this paper resorts to the RB based modified-LR statistic to examine causality between exports and economic growth for both China and Taiwan.

To demonstrate this *RB* based modified-*LR* causality test, we can consider the following bivariate VAR (p) process as:

$$y_t = \phi_0 + \phi_1 y_{t-1} + \dots + \phi_p y_{t-p} + \varepsilon_t, t=1, 2, \dots, T \quad (1)$$

Where: $\varepsilon_t = (\varepsilon_{1t}, \varepsilon_{2t})'$ is a white noise process with zero mean and covariance matrix Σ . The optimal lag length p is determined by the Schwarz Criteria (SC) in this study. If $y_t = (y_{1t}, y_{2t})'$ is split into two sub-vectors, y_{1t} (economic growth) and y_{2t} (exports), the equation (1) can accordingly be represented as:

$$\begin{bmatrix} y_{1t} \\ y_{2t} \end{bmatrix} = \begin{bmatrix} \phi_{10} \\ \phi_{20} \end{bmatrix} + \begin{bmatrix} \phi_{11}(L) & \phi_{12}(L) \\ \phi_{21}(L) & \phi_{22}(L) \end{bmatrix} \begin{bmatrix} y_{1t} \\ y_{2t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \quad (2)$$

Where: y_{1t} and y_{2t} indicates the economic growth and exports, respectively. In the empirical section, $\phi_{ij}(L) = \sum_{k=1}^{p+1} \phi_{ij,k} L^k$, $i, j = 1, 2$ and L is the lag operator defined as $L^k x_t = x_{t-k}$.

Based on *Eq. (2)*, the null hypothesis that exports does not Granger cause economic growth is tested by imposing the restriction, $\phi_{12,k} = 0$ for $k = 1, 2, \dots, p$. Similarly, the null hypothesis that economic growth does not Granger cause exports is tested by imposing the restriction, $\phi_{21,k} = 0$ for $k = 1, 2, \dots, p$. As discussed, the full-sample causality tests in this paper are relied upon *RB* based *p*-values and modified-*LR* statistics. If the first null hypothesis, $\phi_{12,k} = 0$ for $k = 1, 2, \dots, p$ is rejected, then there is a significant causality running from exports to economic growth in Taiwan. This means that export development can promote economic growth in Taiwan. In the same manner if the second null hypothesis, $\phi_{21,k} = 0$ for $k = 1, 2, \dots, p$ is rejected, we can say that exports is caused by economic growth in Taiwan.

3.3. Stability Test

Because the full-sample causality tests usually assume that parameters of the VAR model used in testing are constant over time. However, when the underlying full-sample time series have structural changes, the assumption is probably violated. The results from the full-sample causality tests would become invalid and hence the causal links between series would show instability (Balcilar and Ozdemir, 2013). Granger (1996) stresses the issue of parameter non-constancy as one of the most challenging issues faced by recent empirical studies. As a result, tests for short-run and long-run parameter stability should be conducted in our study.

In the presence of structural changes, parameters in our VAR models estimated using full-sample data from both China and Taiwan will shift with time. The causal relationship between exports and economic growth will accordingly be unstable. Therefore, the full-sample causality tests with assumptions of parameter constancy and a single causal relationship across the whole sample period are no longer reliable, and the ensuing results turn to be meaningless (Zeileis *et al.*, 2005). For this reason, this paper proceeds to test for parameter stability and to determine whether structural changes exist. We use the *Sup-F*, *Mean-F* and *Exp-F* tests developed by Andrews (1993) and Andrews and Ploberger (1994) to investigate the temporal stability of parameters in the above VAR models formed by the export and economic growth. The L_c test of Nyblom (1989) and Hansen (1992) is also used to test for all parameters in the overall VAR system.

As we have used the *Sup-F*, *Mean-F* and *Exp-F* tests developed by Andrews (1993) and Andrews and Ploberger (1994) to investigate the short-run parameters stability of our VAR model. Nevertheless, it is noted that when the underlying variables in levels are cointegrated, the VAR model in first differences is misspecified unless it allows for error-correction. Hence, it is very essential to test for parameter stability of the long-run relationship. This is achieved based on different structural changes and parameter stability tests on the long-run relationship estimated using the Fully Modified ordinary least squares (*FM-OLS*) estimator of Phillips and Hansen (1990). Here, the L_c test proposed by Nyblom (1989) and Hansen (1992) is mainly applied to investigate the long-run parameters stability.

3.4. Sub-Sample Rolling Window Granger Causality Test

Structural changes can be identified beforehand and incorporated into the estimation using several techniques such as sample splitting and the use of dummy variables. However, these techniques impose a disadvantage of pre-test bias. In order to overcome the parameter non-constancy and avoid pre-test bias, this study is therefore proposed by using the rolling-window sub-samples Granger causality test based on the modified bootstrap estimation. Two important reasons justify the use of the rolling estimation. First, the rolling window agrees with the fact that the causal relationship between variables changes over time. Second, the rolling estimation can observe instability across different sub-samples due to the presence of structural changes.

Following Balcilar et al. (2010), the rolling window technique is based on fixed-size sub-samples rolling sequentially from the beginning to the end of the full-sample. Specifically, given a fixed-size rolling window including l observations, the full-sample is converted to a sequence of $T-l$ sub-samples, that is, $\tau-l+1, \tau-l, \dots, T$ for $\tau = l, l+1, \dots, T$. The *RB* based modified-*LR* causality test is then applied to each sub-sample, instead of estimating a single causality test for full sample. Possible changes in the causal links between exports and economic growth for China and Taiwan are intuitively identified by calculating the bootstrap p -values of observed *LR*-statistic rolling through $T-l$ sub-samples. More importantly, the magnitude of the effect of exports on economic growth as well as that of economic growth on exports is also assessed in this study. The impact of exports on economic growth is defined as the average of the entire bootstrap estimates deriving from the formula $N_b^{-1} \sum_{k=1}^p \hat{\phi}_{21,k}^*$, with N_b representing the number of bootstrap repetitions; in similar manner, the impact of economic growth on exports is obtained from the formula $N_b^{-1} \sum_{k=1}^p \hat{\phi}_{12,k}^*$. Both $\hat{\phi}_{21,k}^*$ and $\hat{\phi}_{12,k}^*$ are bootstrap estimates from the VAR models in Eq. (2). The 90-percent confidence intervals are also computed, where the lower and upper limits equal 5 and 95 quantiles of each of the $\hat{\phi}_{21,k}^*$ and $\hat{\phi}_{12,k}^*$ respectively (Balcilar et al., 2010).

The accuracy and performance of rolling window estimation depends on the increment interval of each regression and the window size l . Small intervals such as one are recommended as they provide more detailed transition since it maximizes the total number of rolling regressions. The window size l is the parameter that controls the number of observations covered in each sub-sample and also the precision of estimates. A large window size may improve the accuracy of estimates but may reduce the representativeness especially in the presence of heterogeneity. However, a small window size reduces heterogeneity and improves the representativeness of parameters but may reduce parameter accuracy by increasing the standard errors of estimates. Consequently, the window size should be set to balance the trade-off between representativeness and accuracy.

No consistent criterion is available for us to select the window size in rolling window estimation (Balcilar et al., 2010). Pesaran and Timmerman (2005) assess the window size

under structural change according to root mean square error. They show that the optimal window size depends on persistence and size of the break. Based on their Monte Carlo simulations, they argue that the bias in autoregressive (AR) parameters are minimized with a window size as low as 20 when there are frequent breaks. Two conflicting demands have been taken into account when we choose the suitable window size. First, the degree of freedom that relates to the precision of parameter estimates requires for a larger window size; second, the presence of multiple structural changes that possibly increases the risk of including some of these multiple shifts in the windowed sample claims for a smaller window size. Therefore, a small window size of 18 quarters is chosen in this study (this excludes the observations required for lags and hence is the actual number of observations in the VAR) for both China and Taiwan. As for the issue of inaccurate estimates as a result of the selected small window size, it can be addressed by the bootstrap technique employed in the rolling estimation for better precision.

4. Empirical Results and Policy Implications

4.1. Empirical Results from both Unit Root Test and Cointegration Test

The empirical results for ADF, PP and KPSS tests are presented in Tables 2 (test without trend) and 3 (test with trend) clearly indicate that both ADF and PP tests fail to reject the null of non-stationary in both two variables for both China and Taiwan. KPSS also give us similar results as those of ADF and PP tests. However, the results for first difference indicate a strong rejection of the null hypothesis for both two variables. These results show that both exports and real GDP in both China and Taiwan are non-stationary. Based on these results, we proceed to test whether these two variables are cointegrated using the cointegration test of Johansen and Juselius (1990, hereafter JJ) for both China and Taiwan.

Table 2. Unit Root Tests (ADF, PP and KPSS) for China and Taiwan (without Trend)

Countries	Levels			First Difference		
	ADF(k)	PP(k)	KPSS(k)	ADF(k)	PP(k)	KPSS(k)
China Export	0.062(0)	0.028(3)	1.442[9] ***	-11.279(0)***	-11.288(4)***	0.160[3]
China GDP	-0.373(0)	-0.378(3)	1.451[9] ***	-6.618(1)***	-13.624(2)***	0.050[3]
Taiwan Export	-1.231(0)	-1.471(11)	1.434[9] ***	-9.693(0)***	-9.789(11)***	0.188[10]
Taiwan GDP	-2.563(0)	-2.682(5)	1.423[9] ***	-10.210(0)***	-10.206(1)***	0.646[1]

Notes: The number in parenthesis indicates the lag order selected based on the recursive t-statistic, as suggested by Perron (1989). The number in the brackets indicates the truncation for the Bartlett Kernel, as suggested by the Newey and West (1994). *** denotes the significance levels at 1%.

Table 3. Unit Root Tests (ADF, PP and KPSS) for China and Taiwan (with Trend)

Countries	Levels			First Difference		
	ADF(k)	PP(k)	KPSS(k)	ADF(k)	PP(k)	KPSS(k)
China Export	-2.464(0)	-2.464(0)	0.149[9]**	-11.237(0)***	-11.247(4)***	0.149[3]
China GDP	-3.424(5)	-2.564(2)	0.054[9]	-6.594(1)***	-13.581(2)***	0.044[3]
Taiwan Export	-2.967(1)	-2.138(7)	0.226[9]***	-9.756(0)***	-10.442(13)***	0.049[11]
Taiwan GDP	-0.534(0)	-0.534(4)	0.360[9]***	-10.688(0)***	-10.760(6)***	0.053[5]

Notes: The number in parenthesis indicates the lag order selected based on the recursive t-statistic, as suggested by Perron (1989). The number in the brackets indicates the truncation for the Bartlett Kernel, as suggested by the Newey and West (1994). ** and *** denotes the significance levels at 5% and 1%, respectively.

Johansen and Juselius (1990) propose two test statistics for evaluating the number of cointegrating vectors: the trace (Tr) and the maximum eigenvalue (L-max) statistics. It is well known that the JJ cointegration tests are very sensitive to the choice of lag length. The Schwartz Criterion (SC) is used to select the number of lags required in the cointegration test. A VAR model is first fit to the data to find an appropriate lag structure. The Schwartz Criterion (SC) suggests 4 lag for our VAR model for both China and Taiwan. Table 4 reports JJ results indicate that both the trace (Tr) and the maximum eigenvalue (L-max) statistics point out that there exist no cointegration between exports and real GDP for both China and Taiwan over the period of 1980Q1-2013Q3.

Table 4. Panel A: JJ Cointegration Rank Test base on Maximum Likelihood Ratio

China Export vs. China GDP	Trace test	Critical Value	L-Max test	Critical Value Lag =2
$H_0 : r \leq 0$	6.507946	15.49471	6.205846	14.26460
$H_0 : r \leq 1$	0.302100	3.841466	0.302100	3.841466
Panel: B JJ Cointegration Rank Test base on Maximum Likelihood Ratio				
Taiwan Export vs. Taiwan GDP	Trace test	Critical Value	L-Max test	Critical Value Lag =2
$H_0 : r \leq 0$	9.525360	15.49471	7.510320	14.26460
$H_0 : r \leq 1$	2.015040	3.841466	2.015040	3.841466

Note:

1. The computed Ljung-Box Q-statistics indicate that the residuals are white noise.
2. *indicates singni_cance at the 5% level.
3. Schwartz Bayesian Criterion (SBC) was used to select the number of lags required in the cointegrating test.

4.2. Empirical Results from Granger Causality Test based on Full Sample

The purpose of our paper is to analyze the causal relationship between exports and economic growth for both China and Taiwan. We thus make use of the Granger non-causality test in the bivariate VAR framework proposed by both Balcilar et al. (2010) and Balcilar and Ozdemir (2013).

Since we find no cointegration exists between export and real GDP for both China and Taiwan, therefore, the restriction are tested by using a VAR (p) model in difference variables to test causal relationship between exports and economic growth are for both China and Taiwan. Based on Schwartz criteria (SC), a VAR (4) model was selected for our testing models. By means of the *RB* based modified-*LR* causality tests, the full-sample causality results are reported in Table 5 for China and Table 6 for Taiwan. Based on the bootstrap *p*-values, the null hypotheses are rejected in either direction for both China and Taiwan, indicating presence of full-sample causal links between exports and economic growth (a feedback exists) for both China and Taiwan.

Table 5. Full-Sample Granger Causality Tests - China

	H0: GDP Growth does not Granger cause Export Growth		H0: Export Growth does not Granger cause GDP Growth	
	Statistics	P value	Statistics	P value
Bootstrap LR Test	10.829	0.006***	7.922	0.0185**
Bootstrap Wald Test	10.829	0.006***	7.922	0.0185**

Table 6. Full-Sample Granger Causality Tests - Taiwan

	H0: GDP Growth does not Granger cause Export Growth		H0: Export Growth does not Granger cause GDP Growth	
	Statistics	P value	Statistics	P value
Bootstrap LR Test	13.886	0.072*	26.278	0.002***
Bootstrap Wald Test	14.818	0.072*	29.751	0.002***

4.3. Empirical Results from Stability Test

In the presence of structural changes, parameters in our VAR models estimated using full-sample data from both China and Taiwan will shift with time. The causal relationship between exports and economic growth will accordingly be unstable. Therefore, the full-sample causality tests with assumptions of parameter constancy and a single causal relationship across the whole sample period are no longer reliable, and the ensuing results turn to be meaningless (Zeileis et al., 2005). To this reason, this paper proceeds to test for parameter stability and to determine whether structural changes exist. We uses the *Sup-F*, *Mean-F* and *Exp-F* tests developed by Andrews (1993) and Andrews and Ploberger (1994) to investigate the temporal stability of parameters in the above VAR models formed by exports growth and real GDP growth. The L_c test of Nyblom (1989) and Hansen (1992) is also used to test for all parameters in the overall VAR system.

The corresponding results are reported in Table 7 for China and Table 8 for Taiwan. The *Sup-F* tests under the null hypothesis of parameters constancy against a one-time sharp

shift in parameters are reported in Tables 7 and 8. The results suggest that a one-time sharp shift exists in both exports growth and real GDP growth equations of both China and Taiwan data. The *Mean-F* and *Exp-F* tests under the null hypothesis that parameters follow a martingale process against the possibility that the parameters might evolve gradually are also reported in Tables 7 and 8, respectively, for both China and Taiwan. The results show that parameters in the real GDP growth equation and VAR (4) system formed by both China and Taiwan data evolve gradually with time. The L_c statistics test against the alternative that the parameters follow a random walk process proposed by Gardner (1969), indicative of parameters non-constancy in the overall VAR models estimated using the full-sample data of both China and Taiwan. As a consequence, these results provide robust evidence that the parameters of the estimated VAR models using full-sample data show short-run instability for both China and Taiwan data.

Table 7. Short-Run Parameter Stability Tests - China

	GDP Growth Equation		Export Growth Equation		VAR(2) System	
	Statistics	Bootstrap P value	Statistics	Bootstrap P value	Statistics	Bootstrap P value
Mean-LR	11.54	0.01***	31.36	0.01***	33.54	0.01***
Exp-LR	59.33	0.01***	35.88	0.01***	64.32	0.01***
Sup-LR	127.77	0.01***	80.58	0.01***	137.76	0.01***

Table 8. Short-Run Parameter Stability Tests - Taiwan

	GDP Growth Equation		Export Growth Equation		VAR(4) System	
	Statistics	Bootstrap P value	Statistics	Bootstrap P value	Statistics	Bootstrap P value
Mean-F	9.81	0.03**	18.80	0.01***	27.20	0.01**
Exp-F	14.79	0.01***	28.04	0.01***	16.91	0.01***
Sup-F	38.35	0.01***	64.94	0.01***	41.04	0.01***

Since we find no cointegration between exports and real GDP for both China and Taiwan and we suspect these results might be due to structural change, therefore, we tests for parameters stability of the long-run relationship for both China and Taiwan in the following step. Specifically, the *FM-OLS* estimator is used to estimate cointegration and the *Sup-F*, *Mean-F* and *Exp-F* tests, as well as the L_c test are used to test parameters stability of the long-run relationship. The empirical results are presented in Table 9 for China and Table 10 for Taiwan. Based on the bootstrap p -values, the L_c statistics reject the null hypothesis of cointegration at 1 percent significance level, and meanwhile the *sup-F*, *mean-F*, and *Exp-F* statistics also reject the null hypothesis of parameters constancy at 1 percent significance level. This significant evidence of a one-time shift in the long-run relationship and hence no reliable cointegration between exports and real GDP for both China and Taiwan can be obtained from the *sup-F*, *mean-F*, and *Exp-F* and L_c tests.

Table 9. Parameter Stability Tests of the Long-Run Relationship - China

	Sup-F	Mean-F	Exp-F	L_c
$LRGDP = \alpha + \beta * LEXPT$	68.59	37.01	30.44	6.17
Bootstrap p value	0.01***	0.01***	0.01***	0.01***

Table 10. *Parameter Stability Tests of the Long-Run Relationship - Taiwan*

	Sup-F	Mean-F	Exp-F	L _c
$LRGDP = \alpha + \beta * LEXPT$	296.77	134.84	143.84	9.55
Bootstrap p value	0.01***	0.01***	0.01***	0.01***

4.4. Empirical Results from Sub-Sample Rolling Window Granger Causality Test

Based on the above parameters stability tests, we found both the short-run and long-run parameters in the VAR models estimated using full-sample data show instability due to structural changes and hence the result of feedback at full-sample between exports and economic growth for both China and Taiwan might be misleading and meaningless. Therefore, the VAR models in *Eq. (2)* can serve as a basis framework in which we continue to perform the rolling-window causality test with sub-sample data. The employed rolling-window estimation takes structural changes into account and allows the causal links between variables to be time-varying across different sub-samples, which greatly differ from the existing literature.

We utilize the *RB* based modified-*LR* causality tests with the null hypothesis that exports does not Granger cause economic growth and vice versa, the bootstrap *p*-values of *LR*-statistics are estimated from the VAR models in *Eq. (2)* using the rolling sub-sample data including 18-quarters observations. Besides, the magnitude of the effect of economic growth on exports growth and that of exports growth on economic growth are also calculated for both China and Taiwan. All the rolling estimates for each sub-sample are plotted in Figures 1.a, 1.b, 2.a and 2.b for China and 3.a, 3.b, 4.a and 4.b for Taiwan. After trimming 18-years observations from the beginning of the full sample, these rolling estimates move from 1983Q2 to 2013Q3 for both China and Taiwan.

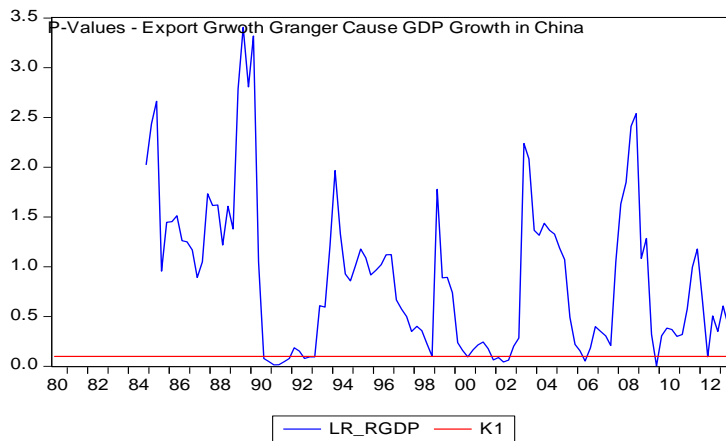
Figure 1.a. *Export Growth Granger GDP Growth in China*

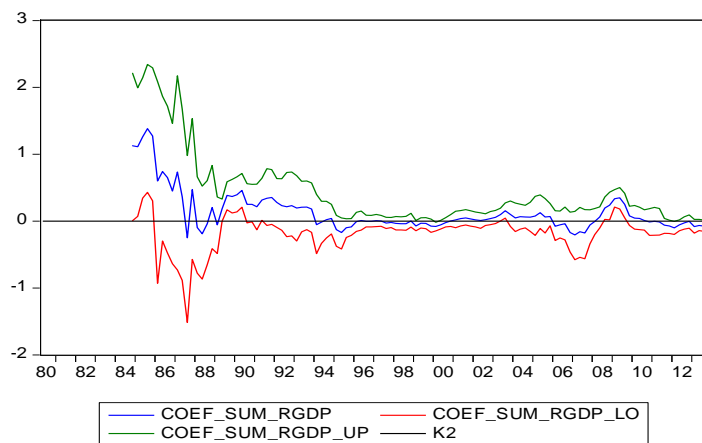
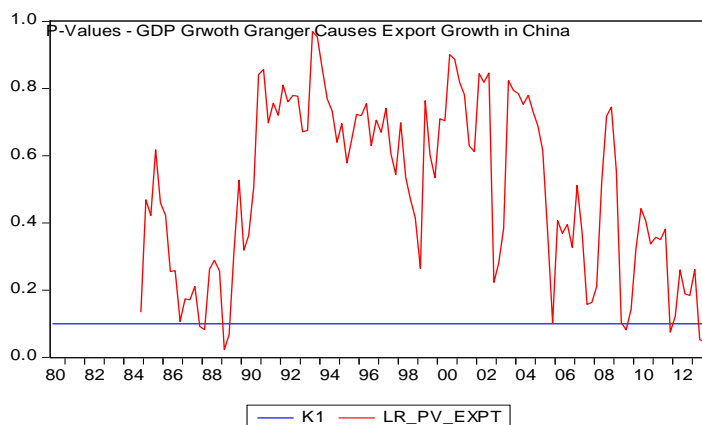
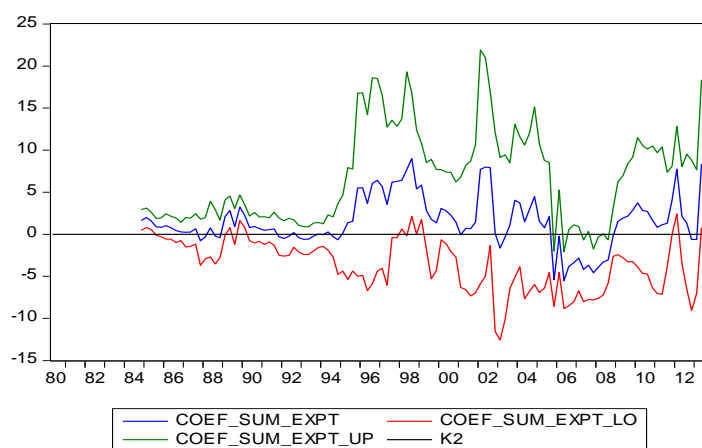
Figure 1.b. Export Growth Granger GDP Growth in China – Coefficients Plots**Figure 2.a. GDP Growth Granger Export Growth in China****Figure 2.b. GDP Growth Granger Export Growth in China – Coefficients Plot**

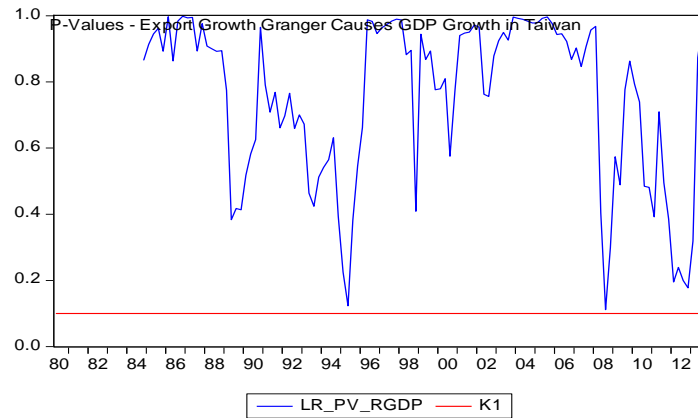
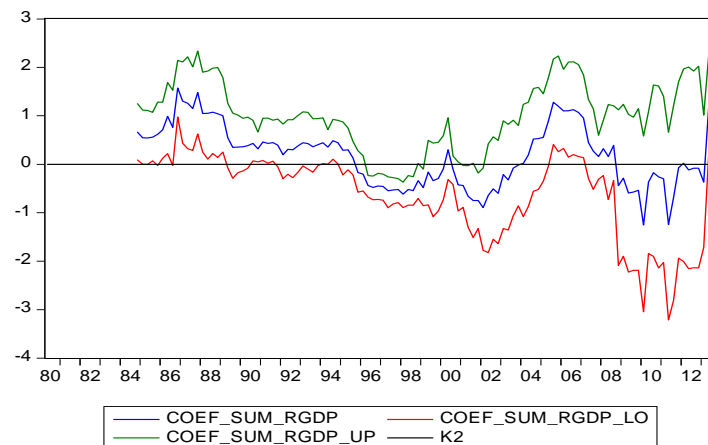
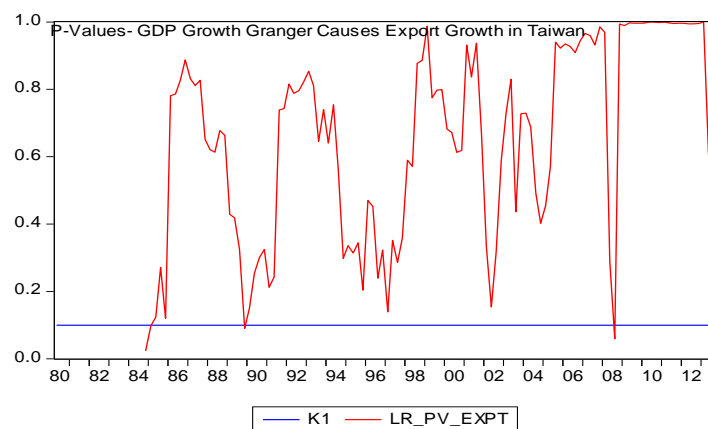
Figure 3.a. *Export Growth Granger GDP Growth in Taiwan***Figure 3.b.** *Export Growth Granger GDP Growth in Taiwan – Coefficients Plot***Figure 4.a.** *GDP Growth Granger Export Growth in Taiwan*

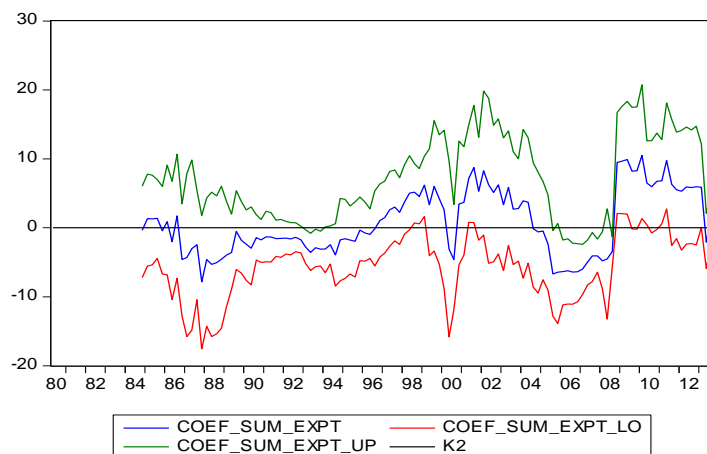
Figure 4.b. GDP Growth Granger Export Growth in China – Coefficients Plot

Figure 1.a presents the rolling bootstrap p -values of LR -statistics estimated using sub-samples data. The null hypothesis that exports growth does not cause economic growth can be rejected at 10 percent significance level for China during 1984Q4-1985Q2 and 1989Q2-1990Q1 two periods. Therefore, the p -values greater than 0.1 (the part above the red line) are ignored to protect against low power results. Figure 1.b gives the bootstrap estimates of the sum of the rolling window coefficients for the impact of exports growth on economic growth in China. Figure 1.b, shows that in the two periods of 1984Q4-1985Q2 and 1989Q2-1990Q1, exports growth has a significantly positive impact on economic growth. Overall, the bootstrap sub-sample rolling estimates in Figures 1.a and 1.b indicate that the exports growth has quite a weak effect on economic growth in China. The movements in exports growth have low power in explaining the economic growth for China over the past 3 decades (except for those of 1984Q4-1985Q2 and 1989Q2-1990Q1 two periods). Figure 2.a reports the rolling bootstrap p -values of LR -statistic with the null hypothesis that economic growth does not Granger cause export growth in China. Figure 2.b presents the rolling estimates of the magnitude of the effect that economic growth has on exports growth. Based on the finding from Figure 2.a, the null hypothesis is rejected at 10 percent significance level mainly in the periods of 1987Q4-1988Q1, 1989Q1-1989Q2, 2009Q3, and 2013Q2-2013Q3 for China. Moreover, as shown in Figure 2b, economic growth in China has a significantly positive impact on exports growth in those periods of 1987Q4-1988Q1, 1989Q1-1989Q2, 2009Q3, and 2013Q2-2013Q3 for China. Based on the result from Figures 1a, 1b, 2a, and 2b, we can conclude that exports and economic growth has a weak feedback relationship exists in China.

Figure 3.a presents the rolling bootstrap p -values of LR -statistics estimated using sub-samples data. The null hypothesis that exports growth does not cause economic growth can not be rejected at 10 percent significance level in any period for Taiwan. Because all the p -values are greater than 0.1 (see the part above the red line). Figure 3.b gives the bootstrap estimates of the sum of the rolling window coefficients for the impact of

exports growth on economic growth in Taiwan. Figure 3.b shows that exports growth has positive impacts on economic growth in most of the sample periods (though it is not significant). Overall, the bootstrap sub-sample rolling estimates in Figures 3.a and 3.b indicate that exports growth has no effect on economic growth in Taiwan. The movements in exports growth have no power in explaining the economic growth in Taiwan over the entire sample period.

Figure 4.a reports the rolling bootstrap p -values of LR -statistic with the null hypothesis that economic growth does not Granger cause exports growth in Taiwan. Figure 4.b presents the rolling estimates of the magnitude of the effect that economic growth has on exports growth. Based on the finding from Figure 2.a, the null hypothesis is rejected at 10 percent significance level mainly in the periods of 1984Q4-1985Q1, 1989Q4, and 2008Q3 for Taiwan. Moreover, as shown in Figure 4, economic growth in Taiwan has a significantly positive impact on exports growth in the periods of 1984Q4-1985Q1, 1989Q4, and 2008Q3. Based on the result from Figures 3a, 3b, 4a and 4b, we can conclude that Granger causality running from economic growth to exports growth in Taiwan.

Several findings and policy implications can be concluded here. First of all, a feedback exists between real exports and economic growth in China. This result indicates that exports and economic growth reinforce each other. This result is consistent with the view of Helpman and Krugman (1985) and Bhagwati (1988) that exports may arise from the realization of economies of scale due to productivity gains; the rise in exports may further enable cost reductions, which may result in further productivity gains. On the other hand, increased trade (irrespective of cause) produces more income, which leads to more trade, and so on. Second, one-way Granger causality running from economic growth to exports was found in Taiwan, the major policy implications of this finding is that growth-driven export model is support here. This means that increasing in economic activity through human capital and technology improvements stimulates export growth because producers need new foreign markets to absorb the subsequent increase in supply. The major policy implication of this finding is that exports can not be used a driven-engine for economic growth in Taiwan.

5. Conclusions

This paper re-examines the causal link between exports and economic growth for both China and Taiwan, using a rolling window Granger causality test over the 1980.Q1-2013.Q3 period. Our empirical results based on full-sample Granger causality test find evidence of feedback between exports and economic growth for both China and Taiwan. However, results from our parameter stability test indicate that there is instability in our VAR model. We doubt these results might be misleading due to instability in our VAR model and these motivate us to use the bootstrap rolling window estimation to investigate the export and economic growth nexus which accounts for the time varying causal link between these two variables. Our empirical results from rolling window Granger causality test indicate that exports growth did Granger cause economic growth in some

certain periods, 1984Q4-1985Q2 and 1989Q2-1990Q1 for China and no relationship for Taiwan. On the contrary, economic growth also Granger cause exports growth in some periods, 1987Q4-1988Q1, 1989Q1-1989Q2, 2009Q3, and 2013Q2-2013Q3 for China and 1984Q4-1985Q1, 1989Q4, and 2008Q3 for Taiwan. Our empirical results have important policy implications for both China and Taiwan.

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Sustainability of balancing item of balance of payment for OECD countries: evidence from Fourier Unit Root Tests

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Abstract. *In this paper, the sustainability of the balancing item of balance of payments is examined for 33 OECD (Organization for Economic Co-operation and Development) member countries. The sample period of each country is dependent upon the availability of data and Fourier unit root tests are employed in analysis. According to the empirical analysis the balancing item of balance of payments is sustainable for Australia, Canada, Hungary, Norway, Switzerland and United States. The results also show that nonlinearity is essential characteristic for the balancing item of balance of payments.*

Keywords: Balancing item of balance of payments, net errors and omissions, sustainability, Fourier unit root test, nonlinearity.

JEL Classification: C22, F32.

1. Introduction

The balance of payments is defined in the International Monetary Fund's *Balance of Payments Manual* as the statistical statement, which summarizes the economic transactions of an economy with the rest of the world in accordance with the double entry system over a specific time period. According double entry system every transaction is recoded with two equal valued entries, which are a credit and a debit entry. Thus in principle, the total recorded credit is identical to the total recorded debit, and consequently the credit and debt accounts should balance. However, in practice, there is generally a difference between two accounts and in order to eliminate the imbalances the difference is added as a balancing item. The balancing item is called as the net errors and omissions, which consists of the transactions that are either recorded incorrectly (errors) or not recorded at all (omissions) (Mishra et al., 2008, pp.190).

Özekicioğlu and Taştan (2013) assert that the economic conditions of a country determine the sign of the balancing item, namely as a compensator factor the balancing item has a positive sign in economies with positive economic conjuncture and expectations and a negative sign with the instable economic conditions. Moreover as mentioned by Tang and Lau (2009), since serious and systematic errors will cause persistently large positive or negative balancing items, through both policymakers and investors eyes the size of balancing item can be considered as an important indicator about the reliability and accuracy of balance of payments statistics. However, the authors also noted that large positive and negative errors may be offsetting, thus small balancing items is not necessarily imply the presence of small errors and omissions. In this context, the sustainability of the balancing item should be examined rather than the size or sign of it. Because, if balance of payments statistics are reliable and accurate, then net errors and omissions should be a stationary time series with mean reversion to zero (Lin and Wang, 2009, pp. 2739).

There exists a limited literature that has studied the sustainability of the balancing item of the balance of payments. Tang (2007) has examined sustainability of the balancing item of G7 countries via unit root tests with unknown level shift and found that France, Germany, Italy and Japan have sustainable balancing item. Mishra, et al. (2008) assert that the balancing item of the balance of payments in Australia is sustainable for the period consisted from the first quarter 1960 to the second quarter 2006, furthermore it has a non-linear behavior. They have reached this conclusion by applying an unrestricted two-regime threshold autoregressive model with an autoregressive unit root. Tang and Lau (2008) have analyzed the sustainability of the balancing item in Asian economies. According to the analysis results for 5 out of 13 Asian countries, which are Bangladesh, Indonesia, Korea, Malaysia and Singapore the balancing item of the balance of payments is sustainable. Tang and Lau (2009) have investigated the sustainability of the balancing item for OIC (Organization of the Islamic Conference) member countries. The authors have used standard univariate unit root tests, panel unit root tests and series specific panel unit root test. They found that the sustainability condition for Albania, Cote d'Ivoire,

Indonesia, Kuwait, Malaysia, Mozambique, Pakistan, Tunisia, and Uganda is met. Özekicioğlu and Taştan (2013) have tested the sustainability of the balancing item of the balance of payments for Turkey by using the data, which cover the period 1950-2012. They have used one and two break Lagrange multiplier unit root tests. According to the test results the balancing item is sustainable for Turkey in that period.

The aim of this study is to examine the sustainability of balancing item of balance of payments in OECD member countries via Fourier unit root tests, which considers both nonlinearity and structural breaks.

2. Conceptual framework

Tang (2007) has developed a simple framework in order to analyze the sustainability of balancing item. Since the balancing item (BI) of payments is the difference between the total recorded credit (C) and total recorded debit (D), the following regression equations can be written:

$$C = \alpha D + BI \quad (1)$$

$$D = \beta C - BI \quad (2)$$

Where α and β are restricted to be equal to one. Both in (1) and in (2) the balancing item is considered as the residuals term of the related regression. For the sustainability of the balancing item, the total credit transactions and total debit transactions should be cointegrated. In the context of the cointegration approach of Engle and Granger (1987), a cointegration relationship between the total credit transactions and the total debit transactions would be exist if only the balancing item is stationary. Thus, the sustainability of the balancing item can be determined by testing directly its stationary with the unit root tests.

3. Econometric methodology

Christopoulos and León-Ledesma (2010) propose unit root tests that deal with both exponential smooth transition autoregressive (ESTAR) type nonlinearity and structural breaks of unknown number, duration and form. As in Becker et al. (2006) proposed tests are based on a Fourier function that can model sharp and gradual breaks by approximating the deterministic components of the model. Christopoulos and León-Ledesma (2010) consider the following model:

$$y_t = \delta_0 + \delta_1 \sin\left(\frac{2\pi kt}{T}\right) + \delta_2 \cos\left(\frac{2\pi kt}{T}\right) + v_t \quad (3)$$

Where $v_t \sim N(0, \sigma)$, t is a trend term, T is the sample size and $\pi=3.1416$. And k denotes the frequency of the Fourier function. While h_t is assumed to be a stationary process with zero mean, in (3) the null hypothesis of unit root can be defined as;

$$H_0: v_t = \mu_t, \mu_t = \mu_{t-1} + h_t,$$

and relevant test statistic can be calculated by following three-step procedure explained below:

In first step (3) is estimated by ordinary least squares (OLS) for each integer value of k from 1 to 5 and the optimal frequency of the Fourier function (k^*) is determined by selecting the one that yielding the minimum value of the residual sum of squares. Since high frequencies are not associated with structural breaks, low frequencies should be preferred to test stationarity versus nonstationarity (Becker et al., 2006, pp. 388). Then using the selected frequency, the OLS residuals are computed as follows:

$$\hat{v}_t = y_t - \hat{\delta}_0 + \hat{\delta}_1 \sin\left(\frac{2\pi k^* t}{T}\right) + \hat{\delta}_2 \cos\left(\frac{2\pi k^* t}{T}\right) \quad (4)$$

In the next step, one of the following models is used to test for a unit root on the first steps residuals:

$$\Delta v_t = \alpha_1 v_{t-1} + \sum_{j=1}^p \beta_j \Delta v_{t-j} + u_t \quad (5)$$

$$\Delta v_t = \lambda_1 v_{t-1}^3 + \sum_{j=1}^p \beta_j \Delta v_{t-j} + u_t \quad (6)$$

In both (5) and (6), u_t is a white noise error term. Model (5) and (6) are called as Fourier-ADF (FADF) test and Fourier-KSS (FKSS) test, respectively. Both tests can be used to test for a unit root in the original series after removing the breaks in the deterministic component. But the two tests differ from each other in the context of adjustment mechanism. The former assumes linear adjustment toward equilibrium, whereas the latter assumes that the adjustment speed is nonlinear. In the FADF test $H_0: \alpha_1 = 0$ is tested against $H_1: \alpha_1 \neq 0$ and in the FKSS test $H_0: \lambda_1 \neq 0$ is tested against $H_1: \lambda_1 < 0$ by using t-statistic. Appropriate critical values for these test statistics are tabulated in Christopoulos and León-Ledesma (2010) for different values of k^* .

If in step two the unit root null hypothesis is rejected, then in the third step it is possible to test the presence of unknown temporary breaks, namely $H_0: \delta_1 = \delta_2 = 0$ against $H_1: \delta_1 = \delta_2 \neq 0$ in (3) using the F-test $F_\mu(\tilde{k})$. The rejection of the null hypothesis means that the variable is stationary around a breaking deterministic function. Critical values for $F_\mu(\tilde{k})$ are tabulated in Becker et al. (2006).

4. Data and empirical results

The quarterly balancing item (net errors and omissions) of balance of payments accounts data of 33 OECD member countries have constituted the data set of this study. The countries have included in the study are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States. The data that measured in terms of million US Dollars have been obtained from the official website of OECD. The sample periods are dependent upon the availability of data. The end date is 2015:1 for seven countries and 2014:4 for other countries, but the start date varies based on available data. The sample periods are provided in Table 1. As pointed by Tang (2007) the balancing item is not an economic variable and because of the information lose, the actual patterns of the balancing item cannot be captured by using real data. Therefore, the analysis is conducted with nominal data.

The sustainability of balancing item was examined essentially via Fourier unit root tests in this study, but for the comparison purpose, the Augmented Dickey-Fuller (ADF) unit root test was also employed. Both constant and linear trend inclusive models were used in the ADF unit root test. The optimal lag orders of the FADF, FKSS and ADF unit root tests are determined according to the Bayesian information criterion (BIC). Optimal frequency of the FADF and FKSS models were determined by minimizing the residual sum of squares and the search was conducted for integer frequency values, 1 to 5. Unit root tests results are given in Table 1.

Table 1. Unit root test results

Countries	Sample Period	k^*	$F_{\mu}(\tilde{k})$	ADF	FADF		FKSS	
Australia	1960:1-2014:4	1	93.45***	-2.71	-2.15	(5)	-3.66**	(5)
Austria	2006:1-2014:4	1	4.19*	-3.73**	-3.52*	(5)	-1.02	(3)
Belgium	2008:1-2014:4	2	2.50	-5.34***	-6.34***	(2)	-0.15	(3)
Canada	1981:1-2015:1	2	42.31***	-1.50	-1.70	(4)	-5.13***	(0)
Chile	2003:1-2015:1	1	12.04***	-3.47*	-4.43***	(4)	-2.63	(4)
Czech Republic	1993:1-2014:4	1	3.02	-2.29	-3.09	(3)	-2.31	(3)
Denmark	2005:1-2014:4	1	14.68***	-2.80	-2.40	(4)	-3.01	(4)
Estonia	1993:1-2014:4	1	22.21***	-3.00	-4.37**	(5)	-2.82	(0)
Finland	1995:1-2014:4	1	25.54***	-1.67	-2.37	(3)	-2.65	(4)
France	1999:1-2014:4	1	22.28***	-2.67	-2.80	(4)	-0.75	(4)
Germany	1991:1-2014:4	1	131.50***	-2.61	-1.60	(4)	-0.20	(4)
Greece	2009:1-2014:4	1	10.97***	-1.15	-2.23	(5)	0.36	(5)
Hungary	1995:1-2014:4	1	57.05***	-1.32	-2.31	(4)	-3.26*	(4)
Iceland	1995:1-2014:4	1	28.13***	-2.14	-5.30***	(0)	-2.06	(1)
Ireland	2002:1-2014:4	1	98.46***	-0.62	-4.55***	(0)	-2.89	(0)
Israel	1995:1-2015:1	1	20.43***	-2.65	-1.38	(3)	1.02	(3)
Italy	1995:1-2014:4	1	42.91***	-0.83	-2.56	(4)	-1.25	(4)
Japan	2009:1-2015:1	1	30.23***	-2.93	-5.18***	(0)	-1.09	(1)
Korea	1980:1-2015:1	1	18.09***	-1.74	-1.52	(4)	0.04	(4)

Countries	Sample Period	k^*	$F_{\mu}(\tilde{k})$	ADF	FADF	FKSS
Luxembourg	1995:1-2014:4	1	8.29***	-9.16***	-10.57***	(0) -1.83(3)
Netherlands	2008:1-2014:4	1	26.83***	0.84	-3.51(0)	-3.08(0)
New Zealand	1971:1-2014:4	1	20.75***	-3.19**	-2.99(6)	-2.70(6)
Norway	2005:1-2015:1	2	4.24*	-4.16**	-4.96***	(0) -3.97***
Poland	2004:1-2014:4	1	20.04***	-2.40	-3.86**	(4) -2.70(0)
Portugal	1996:1-2014:4	1	44.96***	-1.10	-2.09(4)	-2.07(4)
Slovak Republic	2008:1-2014:4	1	9.34***	-3.78**	-3.70*(1)	-2.55(1)
Slovenia	1994:1-2014:4	2	18.30***	-1.19	-1.68(4)	-1.17(4)
Spain	1995:1-2014:4	1	77.44***	-1.73	-3.35(4)	-1.98(4)
Sweden	2003:1-2014:4	2	15.07***	-3.93**	-2.79(1)	-1.74(1)
Switzerland	2000:1-2014:4	2	13.17***	-4.31***	-4.89***	(0) -3.81**
Turkey	1992:1-2015:1	1	63.71***	-3.40*	-3.01(5)	-2.43(5)
United Kingdom	1999:1-2014:4	1	9.88***	-2.11	-1.76(4)	-1.39(1)
United States	1960:1-2014:4	1	173.16***	-2.37	-2.36(4)	-3.71**

Notes: (1) *, ** and *** show significance at 10%, 5% and 1% levels, respectively. (2) Optimal lag lengths determined by using BIC are given in parentheses.

As seen in Table 1, according to ADF unit root tests the null of a unit root is rejected for ten countries (Austria, Belgium, Chile, Luxembourg, New Zealand, Norway, Slovak Republic, Sweden, Switzerland and Turkey). In other words, 10 out of 33 the OECD countries have stationary balancing items. When the results of Fourier unit root tests are considered, first it can be seen that the optimal frequency (k^*) is determined as 1 for the majority of the countries and 2 only for six countries which are Belgium, Canada, Norway, Slovenia, Sweden and Switzerland. Next, the Fourier unit root tests are provides conflicting results about the stationary of the balancing item of balance of payments. FADF test results indicate that for 21 out of the 33 OECD countries the null hypothesis of a unit root cannot be rejected even at 10% significance level. The 12 countries of which the balancing item of balance of payments is stationary are Austria, Belgium, Chile, Estonia, Iceland, Ireland, Japan, Luxembourg, Norway, Poland, Slovak Republic and Switzerland. The results of FKSS test, which considers nonlinearity, show that only for 6 OECD countries the sustainability condition of the balancing item is met. The unit root null hypothesis can be rejected for Australia, Canada, Hungary, Norway, Switzerland and United States at the 10% significance level or better. When the results of ADF, FADF and FKSS unit root test are evaluated as a whole, only Norway and Switzerland have a sustainable balancing item. Since ADF and FADF tests may be misleading in the presence of structural break and nonlinearity, respectively, the results of FKSS unit root test is more reliable. In addition, as asserted by Lin and Wang (2009) and Tang (2009) nonlinearity is a common characteristic of the balancing item series. Thus based on the FKSS test results it is concluded that the sustainability hypothesis is valid for Australia, Canada, Hungary, Norway, Switzerland and United States. Additionally, the F-test ($F_{\mu}(\tilde{k})$) rejects the null of constant mean and the results of which indicate that at least one frequency component must be included in estimated models for these countries.

5. Conclusions

The main goal of the current study was to analyze the sustainability of the balancing item of balance of payments for OECD member countries. For that purpose FADF and FKSS unit root tests were used. Both tests can model structural breaks of unknown number, duration and form. Moreover, unlike FADF test, FKSS test also considers nonlinearity. Despite conflicting results are obtained from applied unit root tests, the results of this empirical analysis show that the balancing item of balance of payments is stationary around a breaking deterministic function for Australia, Canada, Hungary, Norway, Switzerland and United States. Therefore, the balancing item of Australia, Canada, Hungary, Norway, Switzerland and United States is sustainable. The findings of this study are consistent with the work of Mishra et al. (2008) which consider nonlinearity for Australia, but not support the works of Özekicioğlu and Taştan (2013) for Turkey, Tang and Lau (2008) for Korea and Tang (2007) for France, Germany, Italy and Japan. The results of this study differ from mentioned studies most likely because of neglected nonlinearity or different sample periods. Nevertheless, it is noted that nonlinearity is essential characteristic for the balancing item of balance of payments, thus it should be considered while examining the sustainability of the balancing item of balance of payments.

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The European Union brand and its appeal to young Europeans – an in-depth perspective from Romanian student

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Abstract. *In the context of globalization and economic crisis, the European Union is facing a series of challenges on a political, economic and identity level, due to the fact that the pillars on which the EU stands no longer satisfy the demands and necessities of the European citizens (Dobrescu and Palada, 2012; Habermas, 2012). As a result, “the foundational myth of the European Union as a vehicle for peace, stability and economic growth is apparently losing its appeal, particularly among younger generations of Europeans” (Kaina and Karolewski, 2009, p. 35). The youth represents an important resource for the European Union and at the same time a major concern, taking into consideration the political and economic trends that have determined them to experience “a general crisis of trust and values” (Future Lab Europe, 2013, p. 7).*

Therefore, this paper aims to identify the way in which European identity is defined in the case of Romanian students. Our main concern is to understand what is determining them to act and feel as members of the European community and, essentially, to identify or not with the EU brand. In this regard, we used a qualitative approach to explore whether the attachment to the European Union is grounded on emotional or utilitarian bonds by taking into consideration the following aspects: attitudes towards the European Union, values, identity markers of the EU brand. Results of the study indicate that at this point, the EU brand has a major scarcity of substance and relevance for Romanian students.

Keywords: branding, European identity, Europeanization, European citizenship.

JEL Classification: F02.

1. Introduction

It has always been stated that „globalization has transformed the relationship between state, market and society” (Wang, 2005, p. 24). This fact coincides with the loss of political legitimacy of the nation-states to their citizens and on the international political scene detrimental to political and economic constructs such as the European Union. The European Union represents an artificial construction with the role of representing the political, economic and social interests of Europe at a global scale, but in the current context the fundamentals that stay at its core aren't relevant anymore to the needs and aspirations of European citizens. Despite the European political elites' efforts of transforming this „Union of diversity” into a commercial brand, EU has failed to fulfill its promise towards its citizens.

Our paper draws on the branding literature in order to understand and convey the basic principles that stand behind the process of brand building. The underlying idea is that in order to build a successful brand, and by extension, in order to a EU brand, the process needs to go beyond basic PR or marketing, as successful branding transforms simple products, services or nations into something more by appealing to the emotional dimension with which individuals could identify. This process is even more interesting and challenging when it comes to the young individuals, as they are seen as 'game changers', and as they put a lot on emphasis on interactive relation with brands. In this sense, “Euope's task is to find a new post-modern *raison d'être* which inspires its own populace and appeals to the wider world as well” (van Ham, 2001, p. 122).

2. Literature review

2.1. The power of brands

Brands and brand building have become buzzwords in today's society and the literature on this subject is flourishing day by day. Due to the nature of our capitalist society, brands gain in importance and power, as they become an integrated part of our lives, as they represent a capital for any business and as they have the power to shape and determine the opinions of consumer. Hence, for any company or institution is essential to build a strong identity and “create associations that can drive market positions, persist over long time periods, and be capable of resisting aggressive competitors” (Aaker, 1991, p. 7). In a world characterized by the free market and high competition is only normal for brands to become so central.

When it comes to discussing what a brand is, specialists offer slightly different perspectives. Kapferer (2004) postulates that brands can be characterized as the integral collection of a consumer's experiences. Other specialists (Kotler and Armstrong, 2008; Aaker, 1991) affirm that brands help consumers associate the goods they want to buy, as are perceived as reflecting the quality of the products. For this reason, brand associations “have been established using product attributes, names, packages, distribution strategies, and advertising” (Aaker, 1991, p. 7). Additionally, Van den Bergh and Behrer (2011) assert that brands are setting the goals that people want to achieve and that building a

brand implies an extensive knowledge of the people's drivers, desires and needs. All these definitions have a common ground: they put emphasis on the consumer and on building an emotional connection. Similarly, Kotler et al. (2010) state that the consumers should be perceived as a whole entity – taking into account all his/her feelings, needs and values. All these elements provide the basis on which business can build their competitive advantage and define their personality and identity. In this sense, Aaker (1991, p. 13) puts forward the idea that “what a business *does* can (...) usually is easily imitated”, while establishing what a business *is* cannot be imitated, hence, defining what a business is allows the competitive advantage to persist in time, bring profits and provide value. Consequently, taking all these factors into account a successful brand should be authentic, should use emotions that appeal to the consumers in order catch their attention and should communicate and convey the same values and interests with their target audience. In other words, it's all about the experience and the dialogue that the brand manages to establish with their consumers and, as Huntely (2006, p. 154) illustrates, consumers want “products that are ‘nice’, ‘well-designed’, ‘good quality’, ‘long-lasting’ and ‘reliable’”.

Furthermore, specialists (Huntely, 2006; Tapscott, 2009; Van den Bergh and Behrer, 2011) show that the young generation (individuals aged 18-35) are even more interested and involved when it comes to brands. Hence, brands for the young generation are an extension of themselves, and when it comes to choosing a certain brand they seek for the best quality, functionality, uniqueness and speed. Additionally, the young generation is inclined to seek familiar, valued brands due their belief that brands offer them social status (Tapscott, 2009; Huntley, 2006; Sutherland and Thompson, 2003; Van den Bergh and Behrer, 2011). Once with the proliferation of new technologies and the amplitude of the new media, brands had to become flexible and open to dialogue, as communication no longer follows the traditional pattern. At the present moment, through the use of social media brands should engage their consumers into an interactive, two-way communication. In this sense, Shih (2009, p. 89) points out that “smart marketers are inserting themselves into these conversations with dynamic and memorable interaction opportunities with their brands”. Moreover, the young generation has grown up into a capitalist system that determined them to perceive “the sphere of consumption as a place to develop personal identity, connect with friends, make choices, influence others and dictate terms” (Huntley, 2006, p. 158), and for this reason it is essential for brands, nowadays, to promote a two-way communication, to provide quality, reliability and authenticity (Huntely, 2006; Van den Bergh and Behrer, 2011).

Nowadays, we do not only use the term *brand* in relation with a product or service offered by a certain company. We use branding and brands when we speak about building a certain identity for ourselves, as individuals, or when we build the identity and image of a nation state. Hence, we can also speak brands that can have a certain social value, in terms of the contribution to the “public wellbeing through the development of socially beneficial new products and services” (Hilton, 2003, p. 49). If we bring into discussion branding for a nation state or even to the EU, as a political, social and cultural project, then the same basic principles apply to them as discussed above. Referring to nation branding Linsay (2002) explains that it involved a totality of feelings, associations and expectations. In the same time, some specialists (van Ham, 2001; Guțu et al., 2009)

concur that needs to be built as a participative process in cooperation with the civil society, as it is a process that implies more than slogans or old-fashioned ad campaigns. The nation brand, just as any other brand, needs to inspire confidence, to appeal to the emotional and to give people a sense of identity. At the same time, when building a nation brand one must take into consideration its reputation. In this sense, Anholt (2007, p. 8) explains the reputation “affects the way people inside and outside the place think about it, the way they behave towards it, and the way they respond to everything that’s made or done there”. In the same time, Van Ham (2001) points out that image and reputation are becoming essential parts in brand building and the nation brand, just as any other product or service, depends trust and satisfaction.

Taking into consideration the EU, Ljunberg (2006) states that presently at the European level there are two brands that coexist: one that is based on history, tradition and common values and cultural diversity; and one that refers to Europe as an artificial construction defined by political institutions, treaties and the common market. The problem raised here is that in order to build a common brand at the European level is that of the overlaying these two brands. Brands focus on values and emotions that consumers associate them with (van Ham, 2001), these elements being needed as well when building a European brand. Europe’s brand can be defined as unity in diversity, since it we share a common history, marked by the two world wars that led to the cooperation of states in order to put an end to conflicts and ensure peace and security for its citizens. The EU brand is defined by unity and compromise, in the same time, this fact bringing and highlighting conflicts in terms of identity. In this sense, van Ham (2008, p. 129) points out that the “globalization and the harmonizing effects of European integration put further pressure on territorial entities to develop, manage, and leverage their brand equity.” In this context, the cooperation between member states is a difficult exercise, that involves on the one hand compromise, and on the other hand, a common general purpose that is to augment the Union’s competitive power at a global level. In this sense, Anholt (2007, p. 26) states that a strong brand can be built “when governments have a good, clear, believable and positive idea of what their country really is, what it stands for and where it’s going, and manage to coordinate the actions, investments, policies and communications”. Extending this to the EU, we can infer that the Union must have a common action plan and coordinate all its efforts in order to build a successful brand. The EU competitive advantage will be reached through a deep cooperation of at the economic, political and social levels.

3. Research design

This article aims to analyze at an empirical level the way that European identity is defined when it comes to Romanian students. Hence, we focus on identifying what determines them to act and feel as members of the European community. Essentially, we are interested to discover whether Romanian students identify or not with the EU brand and in this respect we have concentrated on the following research questions:

RQ1: How is European identity framed in the case of Romanian students? Do they internalize a civic or a cultural sense of their Europeanness?

RQ2: What is the impact of the current economic, political and social context on young generation's sense of belonging to the European community?

RQ3: Are the positive attitudes of Romanian students towards the EU driven only by pragmatic interests or are they, also, linked to emotional bonds?

In order to address these research questions we adopted a qualitative approach, and consequently, conducted 3 focus groups. Our sample comprised 24 students, aged between 19 to 30 years, enrolled in Bachelor degree programs at the following public learning and research institutions: College of Communication and Public Relations- The National School of Political Studies and Public Administration; respectively, Faculty of International Business and Economics - Bucharest University of Economic Studies.

Following Bruter's model (2003, 2004) of interpretation of European identity, the grid for our analysis is twofold: on the one hand, the *civic dimension*, refers to identification with the European Union as a political institution (citizenship, symbols of political integration, trust in European values and institutions), while, on the other hand, the *cultural dimension* indicates identification with Europe as a cultural community (the existence of a common European culture and history, shared memory, feeling closer to fellow Europeans than to non-Europeans). The *civic dimension* comprises several questions regarding: the rights and duties of European citizens; democratic values of the European Union (equality, freedom, security, justice); political and civic engagement; symbolic meaning of the Constitution; European institutional architecture; supranational system of governance and the problematic of the sovereignty of the nation-state. The *cultural dimension* reference questions are constructed by taking into consideration the following aspects: the role of student exchange programs in fostering a sense of belonging to the European community; the role of European institutions in promoting intercultural dialogue and tolerance; the effects of the Europeanization process on national identity and national culture.

4. Results and discussion

In regard to the *civic dimension*, for Romanian students, the status of European citizenship does not give them any sense of pride and their membership towards the European community is often correlated with their personal interests and benefits that derive from their European citizenship, such as: mobility, job opportunities and security: *It gives you safety in addition to being a Romanian citizen and we all know how things work here (Mihai); There are a lot of economic and social benefits and this is what counts for us as young people (Bogdan); There are a lot of economic advantages: you can travel without passport, you can work in a different country... But, being a European citizen doesn't make me more special and I don't define myself in this terms (Ana).*

At the same time, most of the respondents emphasized the fact that they have limited knowledge of their rights and duties as European citizens, due to the deliberate lack of

information driven by political and also economic interests, on behalf of mass media, national politicians and EU officials: *Romanian politicians have no interest in enlighten us, to make us more aware of our rights and Europe doesn't do anything about it (Radu); I am only partially informed of my rights and duties as European citizen and that is because I wanted to be informed about this aspect, and not due to some political initiatives in this sense (Andreea); I haven't noticed any information campaign concerning my rights and responsibilities as a European citizen and if there had been the message didn't got to me (Alina).* This lack of information can be translated into an urgent need for European institutions to become more transparent and also, more focused on young generations' concerns: *From my point of view, only a small amount of information concerning European public policies is being communicated and the information aren't necessarily of interest to me (Alexandra); Transparency is always welcomed by the masses and it would stop corruption (Radu).*

When it comes to the level of trust in European institutions, participants stated that the role of the EU as guardian of all European citizen interests and welfare is only symbolic, highlighting the prevalence of economic and historical cleavages that continue to divide Europe: *At a theoretical level, European institutions should protect our interests, but in practice they don't. I think that European institutions are built to serve group interests, especially financially ones (Mihai). There is a big difference between theory and practice. In theory, European institutions should ensure the welfare of all citizens of the member states, but in practice this doesn't happen. The laws and policies applied are only for the benefit of the most important (Radu), European institutions represent the interests of European citizens, but only part of them and this is the case with the important member states of the EU that have more benefits (Alexandra).* Conversely, for some of the participants, European institutions, especially European Parliament, play an active part in shaping the political agenda by taking into consideration not only European elites interests but also citizens needs and requirements: *I heard a lot of cases with MEPs and their political initiatives to protect human rights. I think they are doing a good job (Bogdan), European institutions favor the interests of political elites but, at the same time, take into account the citizens interest too. It's a vicious circle: they are constrained to do that in order to obtain our vote (Ana).*

Although most of the respondents are supporters of democracy as a model of governance, they are discontent with the way that is represented at the European institutional level. Furthermore, in line with the current research in this field (European Commission Report, 2013) European's Union label as promoter of peace and democracy is losing its appeal among young Europeans: *It's not European Union's business to establish peace and political order between countries (Alexandra); If we go back in history will see that Europe isn't really an example of peace, freedom, solidarity and equality... the Union's image as promoter of peace is only a disguise (Gabriela).* On the other hand, several respondents highlighted the fact that in the current political crisis and redrawing of borders between Eastern and Western Europe, European Union should reinforce its role as a promoter of democracy and security at a continental level: *EU should interfere in the conflict between Russia and Ukraine. For all European citizens freedom is important and European Union's role is to defend it (Alina). In the current international context,*

European Union should act as a decisive factor and to really show what it stands for (Radu).

Despite the fact that Romanian students support democratic values, they are not interested in European elections. Nevertheless, in terms of their relation to politics, students emphasize the lack of trust in Romanian politicians and the political offer that does not match their interests: *I don't think I'll vote in the next European elections. Romanian MPs care only about their personal and political interests and not Romanians' people interests (Mihai); The results on European elections aren't important to me at all. Basically, it doesn't matter who wins because they are all the same and Romanian politicians can't make an important statement on the European political scene (Maria); Our political parties have lost their identity, political doctrine and tradition as historical parties. You don't have where to choose from to represent Romanian people in European Parliament (Daniel).* Conversely, for a small part of the respondents, voting represents the main form of political participation and at the same time a moral obligation of every Romanian citizen. Voting is perceived as the best way for influencing political decision at the national and European level and to make citizens' will and voice heard: *I think my opinion counts. For me it is important to vote (Alexandra); Every vote counts, every individual counts. Every citizen should see voting as an obligation and a responsibility not only towards his own country but also to himself. This is the right thing to do (Bogdan).* Although most of the participants on this study do not embrace a certain political doctrine, this does not imply political apathy. On the contrary, young Romanians are informed on political and social matters and, at the same time, choose to express their opinions through different forms of civic engagement such as online petitions or being members of NGOs. In this regard, social networks such as Facebook represent an important source of information that also enables students to engage in civic activities: *Through social networks you get to be informed and to debate important matters that affect us all (Calin), On Facebook I got to see a series of events that lead to social accountability. There are certain social actions that I have already adhered to: planting trees, signing online petition for Rosia Montana (Bogdan); I use social networks as a source of information but I try to stay away from demonstrations or social actions that involve violence (Alexandra).*

Romanian students' views upon the necessity of establishing a European Constitution are divergent and coincide with different perspectives concerning the political status and model of governance of the European Union. On the one hand, some of the respondents have positive attitudes towards the EU and believe in the future of the European project despite current economic challenges. For them, European Union can take shape of an idealistic concept, only by creating a European federal state: *If we really want to be united, then we should have a Constitution that should apply to all European citizens. We should leave behind old fashioned mentalities and be more open minded (Bogdan), If EU wants to be a super state then it would be right to have a European Constitution. It would be right to be like in SUA: a common Constitution but specific laws for different states (Calin); I think that EU should have a Constitution because it would determine European citizens to be aware of their status and to know their rights and duties (Ana).* On the other hand, the emergence of a European Constitution is perceived as a threat towards the

political legitimacy and territorial integrity of the nation-state: *We must remain a sovereign state. Every country should have its own Constitution. We would lose our values and identity and step by step all frontiers will be destroyed (Alexandra); A European Constitution would mean that we are all the same, a single nation. What would that mean for our children, not to know their own language?! EU just wants to dominate us for our resources (Bianca).*

By reference to the *cultural dimension*, most of the respondents emphasize the fact that although European people share a common history, a common culture doesn't exist, Europe being defined as a melting pot of cultures, traditions, values and languages: *It's obvious that there is no European culture and historically speaking, all major cultures are individualized but there will always be minor cultures that can be assimilated such as ours (Andreea); There is a historic bond but a civilization cannot take shape on basis of cultural differences (Andrei).* The respondents state that unity in diversity remains not only the main feature of the European project, but of Europe itself: *Europe is a mix of different cultures by which historic customs of all countries are being preserved (Radu); All European states are so different, not only from a cultural point of view, but also when it comes to people, mentalities. It is very important to be united, to imagine ourselves that we can build a better future only if we pass our differences (Alina).*

The preservation of national traditions and values are of great importance for Romanian youth, as they shape their identity. In this context, the process of European integration represents a threat to the national culture and the spirit of Romanian people. At the same time, the European integration constitutes a different form of globalization that leads to uniformization of cultures: *We don't know who we are anymore: Romanians or Europeans...they want us to forget our history and traditions (Mihai); We have lost our values. We had a different lifestyle, different traditions, we lost our pride in being Romanian (Alexandra).* An interesting take on the matter is offered by three of the respondents stating that in the communist period, unity and national distinctiveness were best preserved, although this came with a high price: loss of freedom. Conversely, other respondents emphasize the plurality of European cultures and diversity of Europe suggesting that unity in diversity still remains the pillar for further integration: *I believe that culture belongs to everybody and we should learn from each other (Alina); I do not perceive Europeanization as a threat, more as a bonus, because it helps us develop as nation (Bogdan); The European Union represents a cultural union. You, as a citizen, have direct access to other cultures. Bonds are formed between people, ideas and traditions, as long as you are open (Anca).*

Romanian students embrace post-materialist values such as: freedom of expression, equality, solidarity, tolerance, respect for diversity and human rights. Despite the recognition of the efforts of the European Union to promote tolerance and intercultural dialogue between different nations and their citizens, the majority of the respondents state that European economic and social crisis has generated discrimination between the pillars of Europe (England, Germany, France) and nations that are at the periphery of Europe, be that at a geographical or symbolic level: *We are not equal and we all have problems with each other. For example, we don't like Hungarian people or the British and Germans*

don't like us that much (Calin); For the most powerful European countries, I think that tolerance is not a core value, it is promoted only at a discursive level (Ana); Europeans are tolerant only in theory, but in practice we see it every day how it works. If we want to find a job in other country they don't treat us as their equals (Mihai). One of the respondents, by comparison with the United States of America - the bastion of tolerance and freedom- states that European mentalities and not only geographical barriers are the ones that divide the European continent: *Americans are more tolerant and they have a long history that made them become more tolerant than Europeans. Europe is a long way from learning its lesson (Daniel).*

For the participants on this study, cultural exchange programs such as ERASMUS are conducive for promoting tolerance at a continental level: *This type of cultural exchange programs are very important because the change can happen only with the help of young people and getting to know them, their lifestyle and their culture (Alina), Through Erasmus program you have the opportunity to meet people of different nationalities, their culture and at some point you can learn to tolerate them even if they are considerably different (Bianca), I think that Erasmus promotes equality between European countries and their citizens and helps in changing old mentalities (Bogdan).* In accordance with this perspective, cultural differences serve not as psychological barriers but as basis for processes of social inclusion.

5. Conclusion

The European economic crisis has highlighted a series of vulnerabilities of the European project and has also generated a lack of confidence in the future of the EU. Despite this, most of the respondents emphasized the fact that the European Union is much more than an idealistic concept, it's a necessity. Results on this study indicate that the efforts of the European political elites in building a political union by following the pattern of formation of the nation-states (through cultural and political symbols, European political system etc.) have not determined an emotional attachment on behalf of Romanian students towards the EU. On the contrary, most of the participants on this study define their membership towards the European community mainly through their personal interests and benefits that are relevant to their needs and aspirations.

At this point, the EU brand has a major scarcity of substance and relevance for Romanian students. This fact can be translated through the disinterest of young Romanians in adherence to their civic and moral obligations as European citizens especially in terms of political participations in democratic processes. For most of the participants on this study, a federal Europe is perceived as a threat towards national identity and to the territorial and political legitimacy of the nation-state. Also, despite the fact that young Romanians are supporters of democracy, for them EU entails only at a discursive level the promoter of peace and democracy at a continental level.

Results on this study indicate that Romanian students internalize a civic sense of their Europeanness but, at the same time, they define their membership towards the European community through a cost-benefit relationship.

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Mediating effect of job satisfaction in the relationship between psychological empowerment and job performance

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Abstract. *The purpose of this study was to explore the relationships among the four components of psychological empowerment (i.e. meaning, self-determination, competence, and impact), job satisfaction and job performance. This study also tested the mediating effect of job satisfaction on the relationship between the components of psychological empowerment and job performance. A survey questionnaire was used to collect data from a sample of 238 employees in manufacturing industry. SPSS was used to conduct the statistical analysis of all data in this study. Multiple regression analyses were conducted to examine the postulated hypothesis and test the direct and mediated relationships among variables. The findings indicated that meaning, self-determination and impact had positive significant effects on job satisfaction, but competence had no effect on job satisfaction. In addition, competence, self-determination and impact had positive effects on employees' job performance while meaning did not support the proposed relationship. The results suggested that job satisfaction significantly affected job performance. Furthermore, overall job satisfaction fully mediated the relationship between meaning and job performance. In contrast, job satisfaction partially mediated the relationships between competence and job performance, between self-determination and job performance, and between impact and job performance.*

Keywords: Psychological empowerment, job satisfaction and job performance.

JEL Classification: M10.

1. Introduction

In recent years there has been a growing consensus that employee Psychological Empowerment (PE) can be a source of competitive advantage for contemporary organizations. PE was a strategy to enhance organizational performance and to develop a flexible organization that was capable of adapting to a changing external environment. Similarly, it was maintained that employee PE was critical to organizational innovativeness and effectiveness. With the right individuals, job characteristics and organizational environment, PE can have a noticeable effect on motivation and performance (Kimolo, 2013). To improve aspects of manufacturing organization's management, much attention has been given globally to the role that PE plays in improving Job Satisfaction (JS) and Job Performance (JP) (Carless, 2004; Saif and Saleh, 2013). Employee PE has widely been recognized as an essential contributor to organizational success with many authors observing a direct relationship between the level of employee PE and employee JP, employee JS and employee commitment (Meyerson and Dewettinck, 2012). Further literature in PE revealed that organizations where employees were psychologically empowered shows increase in productivity and JS (Carless, 2004, Patah et al., 2009; Fuller et al., 1999). Within a Western context, PE have been demonstrated to be successful in winning the hearts and minds of employees as well as increasing employee performance (Seibert et al., 2004). PE perceptions can enhance the value of work for individuals, increase JS, and contribute to work productivity and success (Spreitzer, 1995). Studies on empowerment have shown that it has a strong correlation to employee performance in terms of higher productivity, JS and reduction in staff turnover in organizations (Degago, 2014). A growing body of research concluded that the human resource management strategy of PE was a significant factor in improving work situations and employee satisfaction (Cai and Zhou, 2009). Furthermore, there was substantial empirical support for the relationship between PE and positive outcomes such as JS and JP (Spreitzer, 1995; Spreitzer et al., 1997; Liden et al., 2000; Kirkman and Rosen, 1999; Laschinger et al., 2001; Seibert et al., 2004; Wang and Lee, 2009; Thomas and Tymon, 1994). Empowering employees enables organizations to be more flexible and responsive and can lead to improvements in both individual and organizational performance. Empowered employees view themselves as more effective in their work and they are evaluated as more effective by their co-workers (Quinn and Spreitzer, 1997). PE enables them to adopt performance enhancing behavior and contribute to the development of the organization's competitive strength and success. Moreover, employees PE was seen as a motivational technique if designed and implemented properly in organizations. In general, when employees perceive high levels of PE, they are motivated towards their jobs and are likely to experience positive accompanying consequences (e.g., Spreitzer et al., 1997). Empowering employees may be one of the strategies that enable organizations to balance employees' JP and JS. Thus, employee PE empowerment will lead to improving productivity, performance and JS (Greasley et al., 2005). Therefore, employee PE programs have been widely adopted in manufacturing companies as a way of to improve employee JS and JP (Degago, 2014).

On the other hand, employees are considered the most vital and valuable resource of any manufacturing organization; their JS and JP play critical role in an organization's success

and effectiveness. JP has been a very much researched area in industrial and organizational psychology due to its importance to an organization. An organization's success very much depends on the performance of its employees, thus good JP is something organizations try to foster. Focus on performance was an important key factor on employee PE (Kimolo, 2013). Very little was known, however, about the effect of PE on JP. The purposes of this study were to 1) investigate the relationships between perceived PE components (i.e. meaning, competence, self-determination and impact), JS and JP, 2) empirically test the effects of perceived PE components on JS and JP; 3) explore the mediating role of JS in the relationship between perceived PE components and JP in the context of manufacturing sector of Turkey. To address the purposes of this study, the major research questions addressed by this study were: 1) How do PE components affect JS?; 2) How do PE components affect JP?; 3) How do JS affect JP?; and 4) Do JS mediate the relationships between PE components and JP? These four research questions will be used to guide the empirical investigations of the research conceptual model that based on the theoretical framework presented in literature review. This study will contribute to the body of knowledge of employees PE by empirically investigating the relationship between PE components and JP through the mediation mechanism of JS in the manufacturing sector of Turkey. It was hoped that the study findings may assist organizations to develop more efficient ways to enhance their employees' JS and JP, which was of importance to academia as well as for practical application in business. Accordingly, the study will make management to view employees PE as an opportunity of maximizing JS and JP. Thus, the study specifically will inspire managers to come up with various interventions on how to increase JS and JP of employees in their organizations by using employees PE programs as one of the strategies.

2. Literature Review

In an attempt to better operationalize the construct "*Psychological Empowerment*" Spreitzer (1995a) builds on the theoretical model constructed by Thomas and Velthouse (1990) to develop a four-dimensional scale to measure meaningfulness, impact, competence, and choice. In her highly referenced work, Spreitzer (1995) renames meaningfulness as meaning and choice as self-determination. Spreitzer (1995) defines employees empowerment as intrinsic task motivation manifested in a set of four cognitions (meaning, competence, selfdetermination and impact) reflecting an individual's orientation to his or her work role. Thus, PE was a construct that included an employee's perception of their degree of autonomy, their ability to have influence in the workplace, their sense of self-competence and their ability to find meaning in the work that they do. Meaning is the value of work goals or purposes judged by an individual's perception relative to his or her own personal mission or expectations. Self-determination is an individual's sense of having choice in initiating and regulating actions. Competence refers to self-efficacy specific to work; that is, the individual's capability to perform work activities with necessary skills *and knowledge*. Impact is the degree to which a person can influence strategic, administrative or operating outcomes at work. The dimensional

approach was undertaken to pay greater heed to the distinct roles played by different PE dimensions (Spreitzer et al., 1997). By investigating these different dimensions, we seek to explore the rich conceptual domain of PE and its relevance to various outcomes. The other construct of the present study was JS. The pleasurable emotional state arising from the appraisal of one's job or job experiences was called JS. Spector (1997) described JS as how people feel about their jobs and different aspects of their jobs. In this study, JS was used as a mediator. Another variable addressed in the study was JP. Employee performance is about employees achieving the results, goals or standards as per the expectations set by the organization (Degago, 2014). In the current study, we focus on the participants' perceived performance. It refers to the degree to which an individual perceives to accomplish tasks better than others in the project group in the average. JP was examined as the dependent variable in this study.

2.1. The Relationship between PE and JS

PE work as a main predictor of the employees' satisfaction with job, the high level of feelings about empowerment reasons to increase JS level whereas on the other hand low level of feelings reason to decrease in JS level (Dhladhla, 2011; Indradevi, 2011). Empowered employees were more satisfied with their jobs, had an increased sense of personal efficacy through participation in decision-making and were encouraged to utilize a wide set of skills and abilities to address different scenarios (Spreitzer, 1997). According to Thomas and Tymon (1994) the task assessments i.e., the facets of PE, generate intrinsic rewards associated with the job, and so they should be positively related to JS. First, there seemed to be strong evidence of a positive association between meaning and JS (Hackman and Oldham, 1980; Spreitzer et al., 1997; Thomas and Tymon, 1994). According to Hackman and Oldham (1980), an important determinant of JS was personal meaning. A sense of meaning was considered necessary for individuals to feel satisfied at work. Having a job that allows fulfillment of ones' desired work values are likely to increase JS. Liden et al. (2000) argued that individuals who feel that their jobs were significant and worthwhile had higher levels of JS compared to those who felt their jobs had little value. Low levels of meaning have been linked to feelings of apathy and lower work satisfaction (Thomas and Velthouse 1990; Wang and Lee, 2009). Empirical research found a positive association between meaning and JS (Spreitzer et al., 1997; Liden et al., 2000). Accordingly, because meaning reflects the fit between the employee and the job, we expect the overall meaning-satisfaction relationship to be positive regardless of the levels of the other components (Wang and Lee, 2009). Second, the literature has yet to establish a consistent link between competence and JS. Carless (2004) reported that competence was negatively related to JS, whereas Spreitzer et al. (1997) reported that competence was positively related to JS among subordinates but not among supervisors. Other research has reported no relationship between these variables (Holdsworth and Cartwright, 2003; Thomas and Tymon, 1994; Wang and Lee, 2009). Third, managerial practices and behavior that promote self-determination, including empowerment practices like granting employees more discretion and providing them with the feedback and skills needed to perform their jobs, may increase JS in different ways (Illardi et al., 1993; Deci et al., 1989). Self-determination improves JS as accomplishments can be attributed more to the individual than to other persons (Liden et al., 2000). Self-determination positively

influences JS due to its effects on intrinsic motivation. Individuals who have autonomy in determining their actions and behaviors find work more interesting and rewarding, thus creating feelings of satisfaction with their job. Self-determination directly affected JS because people who are given authority to improve, develop and make decisions on their jobs may utilize work experiences, skills, knowledge and abilities to enhance their productivities on their own ways. As a result, an empowerment was very critical for them primarily to increase autonomy, leading to persons' JS (Scingduenchai and Prasert, 2005). Researchers have suggested that self-determination-choice is a psychological need and that meeting this need results in JS (Conger and Kanungo, 1988). Empirical results showed a positive relationship between self-determination and JS (Spreitzer et al., 1997). Studies by Liden et al. (2000) and Thomas and Tymon (1994) show that higher levels of personal control are related to JS. Finally, with regard to the impact-satisfaction relationship, strong and consistent evidence was yet to emerge. When a person's job has low impact, the employee can feel demotivated because he or she believes that his or her job has no significance to the organization. Liden et al. (2000) argued that when employees feel that their work can influence outcomes that affect their organization, they tend to feel more involved and therefore gain a sense of satisfaction with their job. Theory on the impact component states that individuals should get a sense of JS when they feel that they have been directly involved in outcomes that affect the organization (Ashforth, 1989). Thomas and Tymon (1994) reported a positive relationship between impact and JS, but Spreitzer et al.'s (1997) study did not support the effect of perceived impact on JS.

Previous research findings have consistently showed that PE was the primary predictor of JS and, as a result, an increase in JS was one of the key anticipated outcomes behind the perceived feeling of PE among employees in the workplace, while low levels of PE in the workplace were strongly related to the reduction in JS (Bordin et al., 2007; Holdsworth and Cartwright, 2003; Spreitzer et al., 1997; Spreitzer, 1995; Thomas and Tymon, 1994; Seibert et al., 2004; Dehkordi et al. 2011; Fulford and Enz, 1995; Kirkman and Rosen, 1999; Bowen and Lawler, 1995; Fuller et al., 1999; Carless, 2004; Indradevi, 2012; Kirkman et al., 2004; Choong and Lau, 2011; Harris et al., 2009; Rae, 2013; Chan, 2003; Menon, 1999; Fernandez and Moldogaziev, 2013). Likewise, the empirical research on the studies linking PE and JS found that PE components were significant and positively associated with JS. However, results of the relationship between the four components of PE and JS vary from one study to another (Dickson and Lorenz, 2009; Carless, 2004; Thomas and Tymon, 1994; Spreitzer et al., 1997; Liden et al., 2000). The study by Carless (2004) examined each of the four components of PE and found significant associations between competence, meaning and impact (but not autonomy) components and JS. The research conducted Harris et al. (2009) found that the quality of LMX relationships and the empowerment gives impact on JS and employee performance. Dhladhla (2011) stated that high levels of perceived PE were associated with high levels of JS. Laage (2003) found that JS as a total correlates practically significant to both of the empowerment questionnaires as well as to impact, self-determination, goal internalization and perceived control. In this study, perceived control was the better predictor of JS than the other sub-scales. Hechanova et al. (2006) found that PE positively correlated both JS

and JP. Bowen and Lawler (1995) argued that PE practices improve JS, in part by giving employees a sense of control and making work more meaningful. In another study on the nurses, Laschinger et al. (2001) agreed that the feelings of PE strongly influenced nurses work satisfaction. At the team level, Kirkman and Rosen (1999) found support for the notion that PE was positively related to JS. George (2013) found that there were positive and significant influences between the four components of employee PE and overall JS. Salazar et al. (2006) found that all PE constructs significantly correlated with managers' JS. However, they stated that only meaningfulness and trust significantly predicted satisfaction levels. Illardi et al. (1993) found that employees who felt strongly that their work allowed them to experience autonomy, competence and relatedness reported higher levels of JS. The findings from Deci et al. (1989) indicated that a managerial orientation that promoted self-determination had a positive effect on general JS among employees. The study conducted by Dickson and Lorenz (2009) concluded that both meaning and impact component had a positive relation with JS of temporary and part-time nonstandard workers. But according to Dickson and Lorenz (2009) competence component did not have any relation and selfdetermination component had a negative relation with JS. Saif and Saleh (2013) found that meaning, self-determination and impact had a significant effect on JS, but competence had no effect on JS. They stated that the highest variation was explained by impact. Rae (2013) found a significant association between the autonomy component of PE and JS. However, no significant association was found between the other PE components: competence, influence, meaningfulness and JS. Malan (2002) indicated a practical significance between JS and perceived control, self-determination and meaning. Spreitzer et al. (1997) concluded that meaning was the strongest predictor of general JS, while impact and self-determination were unrelated to JS whereas Thomas and Tymon (1994) reported that meaning, self-determination and impact were significant predictors of general JS and that competence was unrelated to general JS. In another study by Liden et al. (2000) meaning was an important predictor of JS. But they indicated that competence cognition had a significant negative relationship with JS. According to a study conducted by Fulford and Enz (1995) on the effect of psychological components of empowerment, it was revealed that components of meaningful and influence were the two strongest effects on JS in the hospitality industry. Fock et al. (2011) indicated that influences of PE components on JS were not uniform. Self-determination had the strongest effect on JS followed by impact but no significant results were found with respect to meaning and competence. Dehkordi et al. (2011) stated that meaning, self-determination and competence significantly predicted overall JS. Indradevi (2011) found that autonomy was the most important component that predicted JS followed by meaningful work, competence and impact. Holdsworth and Cartwright (2003) through their research found that three elements of PE, i.e. meaningfulness, self-determination, and impact were in positive and significant relation to JS of the personnel among employees of call centre. Patah et al. (2009) found that meaning, competence, and influence (i.e. self-determination and impact) significantly affected respondents' state of overall JS in five-star hotels in Kuala Lumpur. In their study, Barling and Cooper (2008) found that competence and impact were most strongly related to managerial effectiveness, whereas meaning was the best predictor of JS. In summary, these prior studies described above show that there were mixed findings about the association

between the components of PE and JS. Therefore, it appeared appropriate to examine how an employee's perception of the degree of PE components provided by their workplace may be a key determinant of their sense of JS. Conceivably, if employees can find meaning in their jobs (Spreitzer 1995), congruent with and fulfilling their desired work values, they will be satisfied. Moreover, if employees feel competent (Spreitzer 1995), they are more likely to be confident and satisfied with their job. Furthermore, employees exhibiting high self-determination and impact (Spreitzer 1995) can attribute success to themselves, thereby leading to JS. Consequently, we proposed the following hypothesis:

H₁: PE components (meaning, competence, self-determination and impact) have positive effects on JS.

2.2. The Relationship between JS and JP

The total organizational performance depends on efficient and effective performance of individual employees of the organization. Among employees, JS is often considered as an important motivator and an important influence on employee behaviour and ultimately, organizational effectiveness (Spector, 1997). Employees with higher JS are important since they are more committed to the organization, have higher retention rates and tend to have higher productivity (Bin Hussin, 2011). In order to do that highly satisfied work force is an absolutely necessity for achieving a high level of performance advancement of an organization. Thus every organization tries to create a satisfied work force to operate the well-being of the organization. The study of the relationship between JS and JP is one of the most venerable research traditions in industrial-organizational psychology. Studies have revealed that employees' attitudes and feelings towards their jobs and/or job experiences have been found to have significant effect on their performance (George, 2013). For example, a highly satisfied employee may work more than the expected number of hours, or attempt to achieve organizational goals more efficiently so the organization can achieve higher profits (Rae, 2013). People who have a sense of belonging and are satisfied in their jobs feel that they are valued and meaningful responsibly to perform them toward their goals potentially (Scingduenchai and Prasert, 2005). JS-JP hypothesis refers to the intuitive belief of management that a happy worker is the cause of a productive worker or that a productive employee causes an employee to be happy. The bulk of the early research focused on the individual within the organization and implied that JS leads to higher JP. Research, however, has not yielded any strong evidence that the relationship exists. In a reexamination of the meta-analytic relationship between JS and JP, Judge et al. (2001) indicated that the mean true correlation between JS and JP was moderate in magnitude (.30) and distinguishable from zero. In addition, Judge et al. (2001) recently argued that "the time has come for researchers to reconsider the satisfaction-performance relationship." As can be seen, this is quite open for debate as much today as in the past. A great deal of previous literature aimed at identifying these conditions has focused on the nature of performance, resulting in some evidence that JS may be more strongly related to some aspects of performance than others (e.g., Rehman and Waheed, 2011; Scheicler et al., 2004). Consequently, the researchers on JS and JP have concluded that the two are only weakly, if even related, while one continues to

assume that relatively satisfied workers perform relatively well in their jobs. Based on this discussion, the following hypothesis was proposed.

H₂: JS has significant effect on JP.

2.3. The Relationship between PE and JP: Mediating Effect of JS

In pursuit of better performance, most organizations are putting employee empowerment programs in place which are aimed at creating a link between business objectives and individual objectives (Scingduenchai and Prasert, 2005). PE practices aimed at providing employees with access to job related knowledge and skills and granting them discretion to change work processes increase encouragement to performance. The construct of PE explains how and why an employee's job can act as a motivator to energize, direct, and sustain the employee behaviors that ultimately are associated with both task and contextual JP and employee turnover intentions (Harris et al., 2009). If an employee is high in empowerment and thus motivated by the job itself, the relationship with a supervisor is of less importance as the job provides the motivation and which is associated with more positive outcomes (Harris et al., 2009). PE generates improved individual and organizational performance to help employees reach certain personal goals by authorizing employees to participate in the decision-making process, inspect their own jobs and find and fix problems (Seibert, 2004). Moreover, PE improves performance because of the opportunities empowerment provides for the employees to do their work more effectively. Empowered employees are typically described as self-motivated and committed individuals who feel responsible to perform at high levels of effort (Thomas and Velthouse, 1990). Thomas and Velthouse (1990) says that empowered employees improve performance by recovering quickly from errors in the service delivery, learning from those recoveries, generating and redesigning processes and products. They may feel that the job has become very meaningful and satisfying. Empowered people will handle their jobs creatively and tend to perform their jobs effectively (Scingduenchai and Prasert, 2005). It was well established that an individual who feels meaningful would perceive that related tasks fulfill his or her desired values, and would therefore formulate a favorable attitude toward such tasks and achieve high performance (Hackman and Oldham, 1980). Accordingly, we contended that the meaningfulness derived from assessing tasks in workplace positively affects individuals' JP. Bagherzadeh et al. (2014) found that from among the components of PE, only the meaningfulness component has a direct relationship with JP. Given that the positive relationship between competence and performance has gained empirical support from prior studies conducted in traditional organizational contexts (e.g., Liden et al., 2000; Spreitzer et al., 1997). If tasks are self-assigned by the employees rather than through the chain of commands, they have a high degree of control over what tasks to take on and how to perform these tasks by following their own schemata, as opposed to following the orders from superiors. From a cognitive perspective, they generally have more complete knowledge and information about what they can contribute, and therefore are in a better position than others to identify the right tasks to work on. There is consistent support for the positive effects of autonomy on performance in prior research (e.g., Liden et al., 2000). If the employees jointly determine whether individual inputs can be transformed into valuable collective, they may feel

strongly that they are making an impact on the task. When experiencing impact, an individual would tend to process information systematically, obtain an understanding of a situation, be aware of unexpected consequences of previous actions, and have information necessary to make accurate adjustments in performing the task (Kirkman and Rosen, 1999). Indeed, it was established that impact has a positive effect on performance (Spreitzer et al., 1997). As a result, being passionate about the jobs (perceiving meaning on the job) and confident of their abilities to perform job (being competent) by working autonomously (perceiving self-determination on the job) to make a difference in the workplace (perceiving impact on the job), psychologically empowered manufacturing employees were at advantage position to exhibit high level of JP. In addition, previous research has shown a small but significant, positive relationship between PE and individual JP (e.g., Liden et al., 2000; Spreitzer et al., 1997; Seibert et al., 2004; Scingduenchai and Prasert, 2005; Bordin et al., 2007). Tuuli and Rowlinson (2009) proved that PE had direct and positive effect on JP and also was mediated by intrinsic motivation, opportunity to perform and ability to perform. Kimolo's (2013) study established that there was relationship between employee PE practice and employee JP. On the other hand, Aryee and Chen (2006) provided empirical evidence that PE leads to higher JS and JP in a Chinese sample of manufacturing workers. Chow et al. (2006) demonstrated the fact that empowerment significantly improves performance. Tsala (2008) found out that there was relationship between employee PE and JP at the city council of Nairobi. A study by Dewettinck et al. (2003) suggested that there was a differential impact of the distinct PE dimensions on employee JP levels. Fathi et al. (2012) indicated that there was a direct and strong correlation between the components of PE and employee JP. Degago (2014) found that impact was found to be the most important component followed by competence, meaningful work, and self-determination. However, in predicting the JP in software companies, Indradevi (2012) found that meaningful work was found to be the most important component followed by impact, autonomy, and competence. Iqbal et al. (2013) found that positive relationship between meaningful work, competency and employee JP.

When employees feel that they are powerful and can influence others ultimately they become confident and perform better as well as their JS level increases. Given that the extant literature primarily focused on the understanding of direct effects of PE on JP, we conducted further data analysis to test the mediating effect of JS, because JS may bring JP. Such a test was important as its results would support the necessity of including JS in a research model on the relationship between PE components and behavior outcomes. First, it was well established that performance was a function of JS, and JS may be affected by perceptions and psychological states and other factors such as available time or energy. According to motivation theory, a motivational construct, such as empowerment, affects individual intention to act, but may not lead to behavior outcomes directly. Thus, empowerment would translate into accomplished work by means of the JS. Second, empirical findings on the direct effects of PE have been mixed and even controversial. For example, Thomas and Tymon (1994) found no relationship between competence, one of the critical components of PE, and performance, while Locke and Shaw (1984) found that competence was positively related to performance. The mixed

findings indicated that an examination of possible mediating effects may extend our understanding of PE's effects on performance, resolving the inconsistencies in the extant literature. In a recent study Chiang and Hsieh (2012) found that PE of the employees and organizational citizenship behavior (OCB) positively influenced JP and that OCB also had partial mediation on the relationship between PE and JP. Moreover, Scingduenchai and Prasert (2005) found that PE affected JP indirectly JS. Ke and Zhang (2012) demonstrated that competence and impact have a positive influence on OSS participants' performance, while autonomy and meaningfulness have a slightly negative influence on performance. In addition, they stated that empowerment's effects on performance can be mediated by effort expended. Many more studies showed employee PE to increase JS, and various others find JS to be a key antecedent of JP. Thus, we propose that the effect of employee PE on JP was indirect and mediated by JS. Based upon the theoretical framework discussed above, this study developed following hypotheses.

H₃: PE components (meaning, competence, self-determination, and impact) have positive effects on JP.

H₄: JS will be mediated the positive effects of PE components on JP.

3. Research methodology

3.1. Population and sample

The target population of this research was employees working in a large private textile manufacturing company in Turkey. The list of the employees was obtained from the Human Resources Office of the company which had 462 full time employees. The primary sample consisted of 300 employees who were chosen through simple random sampling method from the list of employees. Participation in the study was voluntary, participants' identities were anonymous and confidentiality of responses was assured. A total of 300 self-administered surveys were distributed by the researchers to employee who agreed to participate in the study and only 238 usable ones were retrieved, resulting in response rate of 79.33%. This rate was considered satisfactory for survey research type. Among the manufacturing employees, a predominant 77.7% were male and 22.3% were female. The average age of employees was 30.74 ± 7.368 in this research. Approximately 46% of them had bachelor's degree, with an average organizational tenure of 4.47 ± 3.719 years. Regarding the marital status of the employees, it was specified that 78 persons (32.8%) were single and 160 persons (67.2%) were married.

3.2. Data collection: survey instrument

The research design adopted for this study was cross-sectional survey method. Self-administered questionnaires were used in data collection. A Turkish version of the instrument was developed using the back-translation method. All the measures were translated into Turkish language and back translated in English for accuracy. Demographic items were included to allow for descriptive statistics to be performed for an understanding of the sample. In addition, the questionnaire was comprised of three individual, pre-existing reliable and valid multi-item scales. The independent variable,

employee's perceived PE, was measured by a 12-item Psychological Empowerment Scale (PES) developed and validated by Spreitzer (1995). It consisted of four subscales and self-reported items that measure four components of PE: meaning, competence, self-determination, and impact. Each scale consisted of three items that were rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree), with high scores indicating high levels of perceptions of PE. The Cronbach's alpha reliability estimate for overall PE was 0.863. The Cronbach's alphas for the four components were 0.825 (meaning), 0.802 (competence), 0.834 (self-determination), and 0.891 (impact). JS was measured using the Job Diagnostic Survey (JDS) developed by Hackman and Oldham (1975). The JDS included a 14-item scale to measure five specific satisfactions; pay, job security, social, supervisory, and growth satisfaction. The format for the items was a 5-point scale ranging from (1) "extremely dissatisfied" to (5) "extremely satisfied." For this study the overall or global measure of JS was assessed, because a global approach can provide a more complete picture of an individual's JS than a facet approach. Responses were summed across the 14 items to obtain the overall JDS score. This was done because theory predicted that JS (overall) would be related to JP (see Judge et al., 2001), and to achieve construct correspondence with overall performance, a measure of overall satisfaction was most appropriate. High scores indicated that the employees had high levels of JS. **In this study**, Coefficient alpha for this scale was 0.925. Self-perceived JP was measured using a 4-item instrument adapted from Sigler and Pearson's (2000) JP scale which revised from Kirkman and Rosen (1999). The response was 5-point Likert scale with 1 representing strongly disagree and 5 strongly agree. High scores indicated that the employees had high levels of JP. The dependent variable of JP had a high reliability coefficient of 0.851.

3.3. Data analysis

All data were analyzed with SPSS version 16.0 software and descriptive-inferential method. First of all, Cronbach's alpha coefficients for each of the scales used in this research were computed using reliability analysis to assess the internal consistency of the measuring instruments. Descriptive statistics such as mean scores and standard deviations were computed according to the variables. Pearson product-moment correlation analysis applied in order to check the nature of relationship between the variables and also to identify the level of autocorrelations in variables and multicollinearity. The primary data analysis technique employed to test the research hypotheses was a series of regression analyses. A hierarchical multiple regression analysis was also conducted to test possible mediating effect of overall JS on the relationship between PE and JP. Standardized beta were used for all of regression analyses. Statistical significance was considered for p values less than 0.05.

4. Results and discussion

4.1. Descriptive statistics and correlation analysis

Table 1 shows the results of the descriptive statistics and Pearson correlation analysis with the Cronbach's alpha for each scale shown in bold and on the diagonal. To

determine to what extent Turkish employees were psychologically empowered, according to Spreitzer's (1995) model, means and standard deviations were calculated for the four components (meaning, competence, self-determination and impact) and overall PE. The results revealed that overall PE reached a mean of 3.9 (SD=0.649), indicating that the employees perceived themselves as highly empowered, confirming that few restrictions in the work environment exist to prevent workers from resolving matters affecting their daily work and that the management of organization provides a relatively high level of PE. Moreover, each component was rated with mean value of greater than 3. Of the four components of PE, meaning had the highest mean (M=4.42, SD=0.667). This result could indicate that employees in current organization felt very proud of and happy with their work and believed that their work environment enabled them to perform their jobs in meaningful ways. The competence component ranked second and its mean was 4.32 (SD=0.666), indicating that employees believed that they had adequate skills to accomplish their daily jobs. Self-determination came third (M=3.57, SD=1.056). This finding lead us to believe that the state or condition of having independence and being able to function alone without management intervention in the work environment was close to average. Impact ranked fourth (M=3.30, SD=1.116), which showed that the employees believed that they had some influence on what occurs in their organizations and that they had an impact on the activities surrounding them. Additionally, the results in Table 1 showed that overall JS reached a mean of 3.12 (SD=0.811), indicating a moderate level of JS. However, JP reached a mean of 4.16 (SD=0.719), showing that the employees perceived that they had relatively high JP. The Cronbach's alphas which reported earlier confirmed the reliability of all measurement scales used for this study.

Table 1. Descriptives and correlations among studied variables

Variables	Mean	SD	1	2	3	4	5	6
1. Meaning	4.42	0.667	(0.825)					
2. Competence	4.32	0.666	0.531**	(0.802)				
3. Self-Determination	3.57	1.056	0.282**	0.386**	(0.834)			
4. Impact	3.30	1.116	0.348**	0.389**	0.417**	(0.891)		
5. JS	3.12	0.811	0.303**	0.224**	0.316**	0.303**	(0.925)	
6. JP	4.16	0.719	0.395**	0.497**	0.417**	0.390**	0.310**	(0.851)

** Correlation was significant at the 0.01 level (2-tailed).

Examination of the correlations between the variables showed that they were highly significant. The results concluded that the four components of employee PE were significantly correlated with each other and were moving in the same direction as one variable or construct. This relationship provided added empirical support for the four componential conceptualization of PE. Moreover, the results indicated that all components of PE were statistically significantly related to JS. Self-determination showed the highest correlation with JS ($r=0.316$). Meaning and impact were also practically significantly related to JS (both medium effects, $r=0.303$). Finally, competence had a weak positive correlation to the measures of JS ($r=0.224$). These relationships could be interpreted that the more Turkish employees had empowerment, the more they were

satisfied with their jobs. Thus, individuals who experienced a sense of purpose in their work, who strongly felt competent in their jobs, who believed that they could influence the system in which they were embedded, and who had self-endorsed goals were more satisfied with their work. In addition, the result indicated that there were fairly significant, moderate and positive correlations between PE components, namely meaning ($r=0.395$), competence ($r=0.497$), self-determination ($r=0.417$), and impact ($r=0.390$), and JP. This meant that higher levels of PE perceptions led to higher levels of JP. The correlation results also revealed that overall JS was significantly and positively correlated with JP ($r=0.310$), thus indicating that the employees who had a high level of JS were likely had high level of JP. All of the bivariate correlations among the six measures were moderate, less than 0.90 and statistically significant ($p<0.01$), indicating that the data was not affected by serious collinearity problem and providing confidence that the measures were functioning properly. Moreover, the correlations among the study variables provided initial support for our hypotheses.

4.2. The effects of PE components on JS

The effects of the four components of employee PE on overall JS were explored and examined by using multiple regression analysis. In order to confirm the H_1 of this study, JS was regressed on the components of PE.

The regression results revealed that the overall model for Equation 1 was significant with an F value of 11.741; $p<0.001$. It was proved that there were positive and significant relationships between PE components and JS. As indicated by the results of the regression test in Table 2, from the four components of PE, meaning, self-determination and impact significantly and directly affected employees' state of overall JS and they were the predictors of JS. The results also indicated that 16.8% of the variance in employee JS was explained by PE components ($R^2=0.168$). The Beta calculations showed that the highest variation was explained by meaning ($\beta=0.203$), the next highest was explained by self-determination ($\beta=0.202$), and the lowest was explained by impact ($\beta=0.157$). However, the competence component had no significant direct effect on JS ($\beta=-0.023$, $p>0.05$) and did not contribute significantly to the model. Therefore, H_1 was only partially supported.

Table 2. *The effects of PE components on JS*

Independent Variables (PE Components)	Dependent Variable (JS)		
	Beta (β)	t-value	Sig.
Meaning	0.203	2.961	0.003**
Competence	-0.023	-0.303	0.762
Self-Determination	0.202	2.830	0.005**
Impact	0.157	2.264	0.024*
R^2	0.168		
Adjusted R^2	0.153		
F	11.741***		

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Standardized regression coefficients (β) are reported.

The results revealed that meaning had positive effect on JS, indicating that the employees who perceived that their job assigned by their superior to be meaningful experienced a higher degree of JS. This is because, if an employee engages himself in a job which is meaningful to him he can derive satisfaction from his work (Spreitzer et al., 1997). This finding was consistent with the previous studies (Yim, 2008; Malan, 2002; Saif and Saleh, 2013; Dickson and Lorenz, 2009; Stander and Rothmann, 2010; Patah et al., 2009; Hackman and Oldham, 1980; Thomas and Tymon, 1994; Salazar, 2000; Fulford and Enz, 1995; Salazar et al., 2006; Hancer and George, 2003; Bowen and Lawler, 1995; Carless, 2004; Liden et al., 2000; Wang and Lee, 2009; Spreitzer et al., 1997; Holdsworth and Cartwright, 2003). This finding indicated that when opportunities were created to experience meaning in work, employees' attachment to work was stimulated, thus resulting in JS. Thus, if the employees' found that the works they perform were consistent with their beliefs, attitudes and behaviours, this would result in higher JS and they would be happy to perform their work. Although Rae (2013) stated that no significant association was found between meaning and JS, this study also revealed that meaning was the better predictor of JS than the other components. This result was aligned with the findings made by Spreitzer (1996) and Barling and Cooper (2008) who also found that the meaning was the strongest contributor to overall JS.

The results revealed that self-determination had positive effect on JS. Carless (2004) found that self-determination (autonomy) was not relationship with JS. Nevertheless, this result was consistent with those from large meta-analyses and the previous studies showing that empowerment practices aimed at providing feedback and granting autonomy were positively related to JS (Yim, 2008; Malan, 2002; Saif and Saleh, 2013; Laschinger et al., 2003; Salazar et al., 2006; Spreitzer et al., 1997; Holdsworth and Cartwright, 2003; Hancer and George, 2003; Scingduenchai and Prasert, 2005; Liden et al., 2000; Thomas and Tymon, 1994; Illardi et al., 1993; Deci et al., 1989; Patah et al., 2009; Rae, 2013). This findings revealed that if the employees felt that had the right choice, he/she motivated in terms of behavior and this intrinsic motivation was caused to increase JS. Thus, this study indicated that it was important for the employees to be given a considerable degree of autonomy in their work roles so that they could feel a sense of JS in the workplace. In other words, when the employees felt they possessed freedom of action and the requisite independence for initiation and consistency of behavior and processes, decisiveness in regard to the manner of performing their career duties and finally the personal ingenuity while performing their responsibilities, they were likely to be more satisfied with their jobs.

The results revealed that impact had also positive effect on JS, indicating that the more the employees perceive a high level of impact, the more they are satisfied with their job. This means that the employees those who were influential in the workplace and who felt that they could influence strategic, administrative or operating outcomes would be most likely to experience a higher level of JS. Spreitzer et al.'s (1997) and Rae's (2013) study did not support the effect of perceived impact on JS. However, the result of this study was consistent with the previous studies (Patah et al., 2009; Laschinger et al., 2003; Salazar et

al., 2006; Hancer and George, 2003; Stander and Rothmann, 2010; Malan, 2002; Dickson and Lorenz, 2009; Holdsworth and Cartwright, 2003; Fulford and Enz, 1995; Bowen and Lawler, 1995; Carless, 2004; Thomas and Tymon, 1994). The finding that impact was positively related with JS, provides support that the perception of impact over one's work can be important in the workplace, even for the employees who may not have high expectations for their opportunities to impact their workplace. It was likely that they perceived impact primarily over local, operational outcomes. Accordingly, they were more satisfied with their current job position, current employer and the type of job that they were doing if they were allowed more opportunities to participate actively in the work-group decision making process in company. Contrary to our expectations, the results indicated that competence had no direct effect on JS. This finding was quite surprising in light of the previously mentioned research. For example, Illardi et al. (1993) and Spreitzer et al. (1997) reported that competence was positively related to JS among subordinates, but several previous studies found that competence was negatively related to JS (Liden et al., 2000; Barling and Cooper, 2008; Carless, 2004; Stander and Rothmann, 2010; Salazar et al., 2006; Hancer and George, 2003). However, there were other studies that also failed to find a significant positive link. Thus, the result of this study was consistent with the findings of Dickson and Lorenz (2009); Yim (2008); Holdsworth and Cartwright (2003); Thomas and Tymon (1994); Rae (2013); and Spreitzer et al. (1997) who also found that the relationship between the competence component of PE and JS was not practically significant. Therefore, it seemed that it did not suffice to simply increase self-efficacy or competence perceptions of employees to increase their JS; rather, additional career opportunities and work redesign may be deemed necessary. There are at least two plausible explanations for this unexpected result. First, it was likely that highly competent employees found it especially difficult to derive a significant amount of satisfaction from their jobs, because they could achieve good results with relative ease. As a result, their jobs may be perceived as less challenging, thwarting perceptions of JS, in line with research on job design. Second, according to self-regulating theories of motivation, individuals possessing high highly competent are more likely to accept or self-set difficult goals, which enhances their levels of motivation. Higher goals demand that individuals push their perceived level of performance to higher levels to be satisfied. But, the failure of achievement of these higher self-set goals may oftentimes give rise to job dissatisfaction. As a result, the findings in this study revealed the need to seek the potential of the sub-component of competence thoroughly in determining JS in the manufacturing industry.

4.3. The Effect of JS on JP

In order to test H₂, a simple regression analysis was conducted and JP regressed on JS. The result indicated that the model for predicting JP based on JS was significant ($F=25.130$, $p<0.001$). The R^2 value was 0.096, which meant that JS was interpreted 9.6 % of the variance of JP. The result also revealed that JS had a positive significant effect on JP ($\beta=0.310$, $p<0.001$), indicating that JS was a significant predictor of JP. Thus support was found for Hypothesis 2. According to this result, satisfied worker leads to extend

more effort to JP, then works harder and better. When an employee feels a satisfaction about the job, he/she is motivated to do grater effort to the JP. This result of the present study was in line with past studies (Bin Hussin, 2011; Judge et al., 2001; Scheicler et al., 2004; Rehman and Waheed, 2011; Pushpakumari, 2008) who found positive relation between JS and JP. Satisfied employees have positive attitudes regarding their jobs. The positive attitudes will increase the quality and quantity of employees' JP. Moreover, satisfied employees are tend to attend to work on time, more concern about the given targets, work speedily, work free of errors and omissions, loyalty and commitment to the job, less dependability, suggest new ideas, tend to improve knowledge, willing to accept more responsibility, obedience of rules and regulations, less absenteeism and effort to retain in the present job.

Table 3. Regression analysis results of the effect of JS on JP

Independent Variable	Dependent Variable (JP)		
	Beta (β)	t-value	Sig.
JS	0.310	5.013	0.000***
R ²	0.096		
Adjusted R ²	0.092		
F	25.130***		

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Standardized regression coefficients (β) are reported.

4.4. The Relationship between PE and JP: mediating effect of JS

Hiercachical regression analysis was undertaken to test the extent of effects of PE components on JP and the mediating effect of JS. We applied Baron and Kenny's (1986) strategy for testing mediating effect of JS with multiple regression. According to them, four conditions must be met to confirm the presence of mediation effect. Firstly, the predictor variable (PE components) must have a significant effect on the mediator variable (JS). Secondly, the mediator variable (JS) must have a significant effect on the dependent variable (JP). Thirdly, the predictor variable (PE components) must have a significant effect on the dependent variable (JP). Finally, the effect of the predictor (PE components) should not be significant (in case of full mediation) or should be reduced in strength (in case of partial mediation) after it was controlled for the mediator variable (JS). The above results fulfilled the first two conditions of testing mediation. Thus, with regard to the first and second conditions, we have shown that perceptions of PE components had significant effect on JS, except for competence and JS had a significant effect on JP (Tables 2 and 3). In the final step of the analysis, we needed to establish whether perceived PE components had significant effects on JP, and whether these effects were reduced or eliminated after the effect of JS had been taken into account. As shown in Table 4, when JS was not in the model (Step 1), all the four PE components had significant effects on JP. Thus the result indicated that PE components (meaning, competence, self-determination and impact) account for 33.9% significant variance in JP ($R^2=0.339$) and this regression model was significant ($F=29.928$, $p<0.001$). It was observed that among PE factors, competence and meaning represent the highest and the

lowest amount of JP variance respectively. According to the result, standardized coefficient beta values between meaning ($\beta=0.132$, $p<0.05$), competence ($\beta=0.294$, $p<0.001$), self-determination ($\beta=0.207$, $p<0.01$), impact ($\beta=0.145$, $p<0.05$) and JP were significant. This result indicated that there were direct positive effects of all PE components on JP. These relationships could be interpreted all PE components were significant predictors of JP, providing support for the third condition and so, H_3 was fully accepted. In the second step, JS was introduced into the overall model of meaning, competence, self-determination, impact and JP. When all of PE components and JP were entered together, they accounted for 35% of the total variance in JP ($R^2=0.350$; $F=25.034$; $p<0.001$) in the final model. Moreover, when JS was introduced as a mediator (step 2 in Table 4), the relationships between competence and JP ($\beta=0.291$, $p<0.001$), between self-determination and JP ($\beta=0.183$, $p<0.01$), and between impact and JP ($\beta=0.126$, $p<0.05$) remained significant. Yet, the relationship between meaning and JP became insignificant ($\beta=0.109$, $p>0.05$). These results indicated that JS partially mediated the relationships between competence, self-determination, impact and JP, but fully mediated the relationship between meaning and JP. Thus, H_4 was accepted as the data support the notion that JS mediated the relationships between PE components and JP.

Table 4. Regression Analysis Results of the Effects of PE Components on JP: Mediating Effect of JS

Independent Variables (Predictors)	Dependent Variable (JP)					
	Beta (β)	t-value	Sig.	Beta (β)	t-value	Sig.
<i>Step 1: PE Components</i>						
Meaning	0.132	2.068	0.040*	0.109	1.684	0.094
Competence	0.294	4.430	0.000***	0.291	4.364	0.000***
Self-Determination	0.207	3.397	0.001**	0.183	2.977	0.003**
Impact	0.145	2.344	0.020*	0.126	2.042	0.042*
<i>Step 2: Mediating Variable</i>						
JS				0.115	1.986	0.048*
R^2	0.339			0.350		
Adjusted R^2	0.328			0.336		
F	29.928***			25.034***		
R^2 Change				0.011*		
F Change				3.944*		

Note: * $p<0.05$; ** $p<0.01$; *** $p<0.001$; Standardized regression coefficients (β) are reported.

The findings indicated that all of PE components were positively and significantly affected the level of employees' JP and they simultaneously predicted it, which was also suggested in previous studies (Indradevi, 2012; Barrutia et al., 2009; Tuuli and Rowlinson, 2009; Degago, 2014; Meyerson and Dewettinck, 2012). By considering the results, competence as one of PE components had the most effect on improvement of employees' JP. Thus, feeling competent at work contributed to JP. This was consistent with the findings of prior researches (Iqbal et al., 2013; Ke and Zhang, 2010; Liden et al., 2000; Spreitzer et al., 1997). Accordingly, as employees become more empowered, their self-efficacy (competence) expectations will be enhanced, thereby increasing the amount

of effort and time they dedicate to performing a task (Conger and Kanungo, 1988). In other words, empowered employees have a higher expectancy in their ability to perform a task successfully; they exert greater effort and persist in those efforts when faced with adversity. The findings also revealed that meaning had a direct positive effect on JP. This was consistent with previous studies (Iqbal et al., 2013; Patah et al., 2009; Indradevi, 2012; Bagherzadeh et al., 2014). Thus, when employees found a fit between their values and the organization's goals and delivering meaningful jobs, they were more likely to be loyal, service oriented, concerned with others, and high performers. Moreover, the results indicated that self-determination had a direct positive effect on JP, which was consistent with previous studies (e.g., Liden et al., 2000). Indeed, a sense of autonomy at work, along with feeling of having control over the outcome, increases effort and in addition to exerting greater effort or working harder, empowered employees also seem to perform better by working smarter by seeking out new and better ways of doing things (Conger and Kanungo, 1988). The employees feel they possess freedom of action and the requisite independence for initiation and consistency of behavior and processes, decisiveness in regard to the manner of performing their career duties and finally the personal ingenuity while performing their responsibilities. The findings indicated that impact had a direct positive effect on JP. Likewise, Ke and Zhang (2010), Spreitzer et al. (1997); Kirkman and Rosen (1999) also found that impact had positive relationship with JP. According to this result, when the employees thought that they have enough power to penetrate in the executive, official and strategic outcomes of their work and also have a great control over whatever takes place in the area of their work, they exhibited high level of JP. So, management should involve and consult employees in decision making process of their organizations. Finally, the results of the mediating regression showed that employee PE components had a positive and substantively significant effects on JS, which in turn, had a negative and substantively significant effect on JP. Thus, the relationships between PE components and JP were positive and mediated by JS. **This findings revealed that there were also indirect effects of PE components on JP through the intervening variable of JS. This meant that** if manufacturing employees perceived high meaning, competence, self-determination, and impact, this may lead to higher JS, which in turn, could lead to higher levels of JP.

Conclusions

This study focused specifically on the relationships between PE components and JP, as well as examining whether JS had any effect on the relationship between these variables among manufacturing employees. The following conclusions were drawn based on the findings of this study. The empowerment scores for each construct indicated that most of the employees agreed that: (1) their jobs retained personal meaning; (2) they felt very competent in performing their jobs; (3) they could practice self-determining behaviors; (4) their work and values had impact on the organization. Thus, this study implied that the employees in the manufacturing organization perceived themselves as highly empowered. Thus, it was established that the management of Turkish organizations

provided a comparatively acceptable level of PE. Moreover, the study displayed that the most employees were satisfied with their jobs and perceived high JP. On the basis of results, the present study implied that the higher the level of PE, the greater the level of JS and JP in Turkish employees. The effect of employees' PE on their level of JS proved to be valid and significant in this study. Thus, the findings of this study provided additional empirical support for Spreitzer's (1995) theoretical suggestion and for the prior studies that emphasized the importance of employees PE as one of the factors influencing JS (Liden et al., 2000; Spreitzer et al., 1997, Carless, 2004; Saif and Saleh, 2013). However, the study did not find that competence component of PE was a predictor for JS in Turkish employees. This finding implied that the employees whose job had a higher level of meaning, those who had self-determination and those who were influential in the workplace would be most likely to experience a higher level of JS. Accordingly, the employees felt higher level of JS when their work goals aligned with their own ideals and standards and the employees considered their career goals valuable and had a noticeable inner motivation about their works. In addition, the employees perceiving themselves as having influence over others was also a critical factor in shaping JS as liking the work and being able to influence what happens at work are critical (Fulford and Enz, 1995). Moreover, the findings suggested that when the employees had more autonomy (self-determination), they would be highly satisfied with their jobs. From the findings in this study, it could be concluded that enhancing employees' PE perceptions by giving them autonomy, independence, feeling of meaning and enhancing their impact would also reason to increase the employees' JS and ultimately the respective organizational overall productivity will increase. However, the study found that the relationship was stronger in meaning followed by self-determination and impact. Therefore, the managers could especially concentrate on the meaning and impact cognitions if they want employees to feel more JS through the process of PE. One way to increase meaning would be to set clear goals that do not contradict the employees' values. Another way would be to make sure employees know how they fit into the big picture of the organization. Showing employees how their jobs fit into the organization and how the tasks they complete affect the outcomes of the company may increase their perception of meaning. Moreover, impact could be increased by giving workers processes by which they can suggest operational changes in their work environment. The employees' PE level can be increased by providing opportunities of participation in decision making, nurturing good environment as well as matching the vales of employees with their work ultimately reasons to increase the employees JS. One of the major findings in the current study was the role of JS as a possible driving force behind the development of JP. This study had identified a strong positive relationship between employee JS and JP. Employees who are extremely satisfied with their jobs will engage in their work with greater and more intense interest and will provide quality care. Moreover, if organizations can be more concerned about the JS of employees, better performances can be expected. This aspect should be given more consideration by the managers in order to improve performance. For this, in macro level managers can be educated the importance of the concept of JS

(Pushpakumari, 2008). In addition, future research should investigate whether or not all four aspects of JS would cause high JP.

The findings of this study recognized a solid relationship among employee PE and JP of the employees. Our data analysis results revealed that meaning, competence, self-determination and impact had positive effects on JP, thus employee performance was anticipated by all determinants of PE. JP was predicted by PE and among the four components of PE, in manufacturing company competence was found to be the most important component predicting JP followed by self-determination, impact, and meaning. Thus the employees would be likely to show a higher level of JP when they found their work meaningful, when they had enough skills to perform their job well, when they had freedom to make decisions about their work, and when they felt that they could have an impact on organizational outcomes. Supervisors and managers play an important role in engaging work environments and increasing JP of employees. Interventions should focus on meaningful work, competence, self-determination and impact. In this study, competence was established to be very essential determinant forecasting the performance of employee. These findings support Spreitzer's PE theory because they both influence the feelings of the employees and these results in an increase in their abilities to get things done. Thus, these results provide encouraging support for the managers to create and maintain an environment which provides good opportunities, ample resources, support, useful information, autonomy, and great support for all employees. Employees who work in these environment will have the capacity to achieve their goals and they will get more power if they feel that they are able to manage their jobs. So, the managers should build the competence of the employees. Furthermore, they could create autonomy-supportive work climates by taking employees' perspectives into account, providing greater choice, and encouraging self-initiation. They must create work environments in which people experience their work as meaningful and where they feel that they can influence events. Influence (self-determination and impact) was stimulated when managers and supervisors provide a meaningful rationale for performing an uninteresting task, acknowledge the perspective and feelings of employees about tasks, and structure work to allow interdependence among employees (Stander and Rothmann, 2010). On the other hand, according to self-determination theory (Ryan and Deci, 2001), feeling competent and confident with respect to valued goals was associated with enhanced intrinsic motivation. It was suggested to organization's manager that: Employees were allowed to get involved in cession of activities, so that they played a role in choosing job and condition of its implementation. Because in this case, it was more possibility that they accepted their delegated tasks eagerly, performed the jobs with competence and experience getting empowered. In delegation of every task, holding a justification meeting was useful and essential. Individuals mustn't be responsible for indefinite tasks; expected result of each task must be expressed clearly. Clearness of whatever must be done the reason for its importance was a prerequisite for delegation of authority and consequently performance improvement. Control and supervision should focus on results instead of methods of performance of the job. When tasks and authorities were obligated, excessive control on performance methods, destroys morale of confidence. The present study implied that, in

addition to direct effects, components of PE indirectly influence JP through JS, confirming that JS mediated the relationships between PE components and JP. Thus, the notion of JS was successfully applied within the empowerment management models of the organization under study. This meant that when the employees of the manufacturing sector were psychologically empowered they feel that their work contributions were meaningful and felt powerful in their abilities to shape the organization, thus leading to more JS and resulting in increased JP of the employees.

The findings of this study supported and broadened PE research literature mainly published in Western and Eastern organizational settings. Accordingly, the more the employees perceived a high level of PE, the more they were satisfied with their job, and the more they had high level of JP. Therefore, special emphasis should be placed on meaningful work and on each of the components of PE. The findings of the study directly benefited the manufacturing industry since the management would initiate employee PE programs which would ultimately result in enhancing employee JP in terms of delivery of effective and efficiency services to the huge client in their areas of jurisdiction. Utilization of the findings contributed to overcome the problems of employee PE in manufacturing sector and given a fair idea that employee JS and JP could be achieved through empowerment. The management should maintain and reinforce the current levels of PE implementation and should do more to enhance PE, as it could lead to work effectiveness and satisfaction without the expenditure of financial resources. Moreover, the managers must fully understand the importance of PE and must be trained in the best method of applying PE in their organizations. Organizations should empower people through participation, supporting resources, information and rewards, freedom *in handling tasks and opportunities* to make decisions. Organization should create a supportive work environment and job characteristics to empower person to work effectively such as job enrichment and promotion. However, employees PE was strongly criticized in increasing the work load of employees. Therefore, management should ensure that employee PE was seen as an opportunity rather a strategy to increase the work load of other employees. Similarly management should put in place internal controls to check the misuse of power and authority in their organizations. Thus employees PE without adequate training of employees would be a major treat to employee relation in organization. Managers should note that PE will not happen naturally in organization, but must be initiated and is an ongoing process. On the other hand, management should be aware that JS has both a vital and a valuable impact on the manufacturing environment and performance. So, managers certainly needed to ensure that employees were satisfied and enjoy what they do at work. More focus should be on developing creativity and rooms for employees to exercise empowerment in order to enhance their JS level and performance thus providing quality service to customers. As a result, in today's global competitiveness there is a great desire on the part of the employees to play an active role in organization activities and as such every effort should be made to accommodate employees' views. Therefore the study recommended that employee PE practices should be supported by both top and middle level management in the regional development authorities as this will improve employees JP tremendously. This study had various

limitations. The study used a cross-sectional research design, which does not allow for assessment of impact or cause and effect. The study used self-report measures, therefore the present findings may be partly affected by common method variance. Future studies should employ longitudinal research design to strengthen conclusions about the causal direction between PE, JS and JP. Data were collected from one organization in the manufacturing industry and therefore the generalizability of the findings to other types of organizations was questionable. The researcher worked with a sample of employees. Future research should seek to replicate and clarify the relationships with larger and more varied samples. The theoretical model proposed in the current study had the potential to be expanded through the inclusion of further variables that were likely to influence JP among employees. Therefore, future research needs to explore the mediating effects of variables that were not measured in this study such as self-esteem, leadership, organization' structure, climate, and culture.

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Analysis of final consumption and gross investment influence on GDP – multiple linear regression model

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Abstract. *This paper emphasizes the application of regression models in macroeconomic analyses. The particular situation approached is the influence of final consumption and gross investments on the evolution of Romania's Gross Domestic Product. The results of such research are supposed to contribute to deeper and more complex analyses of the GDP, the main indicator that shows the performance of a national economy. The dataset is made of official figures drawn from the Romanian Statistics authority, and the analysis is performed with the help of the Eviews software. The proposed model was tested by using proper instruments, the results of the tests are also presented in the paper.*

Keywords: final consumption, gross investment, prices, relationship, value.

JEL Classification: C51, C87, E22.

Introduction

Anghelache et al. (2014) focus on the role and potential of multiple regression instruments to be used in economic analyses. Chamberlin (2011) analyzes reflection on the economic welfare into the Gross Domestic Product. Ioneci and Mîndreci (2010) research the impact of the foreign direct investments on the same macroeconomic indicator, a similar analysis is realized by Mitruț et al. (2014), while Constantin (2013) is more focused on the situation of GDP and investments at the level of Romania and EU. Also, Anghelache (coord., 2012), Iordache et al. (2011) are preoccupied with the utility of econometric models in calculating and forecasting the GDP. A sound reference on statistics and econometrics, including the topics that substantiate the research presented in this paper are the books of Anghelache (2008), Voineagu et al. (2007). Various issues on consumption were approached by Colloredo-Mansfeld (2005). Anghelache (2014) analyzes the situation of GDP, investments and consumption at the level of the Romanian economy.

It is widely known that information for the characterization of GDP evolution by using simple linear regression model, in the analysis of the correlation between this measure and final consumption are not always clear enough to identify its possible subsequent developments. A significant argument in this respect can be considered the high value of the free term (as the reflection of the factors that were not included in the model) in such simple regression.

To remedy these shortcomings, the simple linear regression method can be extended from sets of two variables to more variables by multiple linear regression method, in which case we have a dependent variable and many factor variables (Anghelache et al., 2014; Anghelache et al., 2012; Voineagu et al., 2007; Iordache et al. 2011).

Research methodology and data

Using a multiple linear regression model for the Romanian economy case will offer further insight on the analysis performed using simple linear models. In this regard, we consider the Gross Domestic Product as resultant variable and variable factor to be the final consumption value (Anghelache et al., 2012; Chamberlin, 2011; Anghelache, 2008; Colloredo-Mansfeld, 2005) and the value of gross investment (Constantin, 2013; Mitruț et al., 2014; Ioneci and Mîndreci, 2010) in Romania during 1990-2014. The values of these macroeconomic indicators were deflated using the consumer price index - CPI (Anghelache, 2008), as set by regulations of the National Institute of Statistics, the CPI being used to calculate the inflation rate in Romania, which reflects the evolution of prices and tariffs of goods and services purchased by the population in the current year compared to 1990, the main reference year.

The three indicators can be presented in summary form as follows:

Table 1. GDP by final consumption and investment in Romania during 1990-2014

Year	Gross Domestic Product (comparable prices) million RON*	Final consumption (comparable prices) million RON*	Gross investments (comparable prices) million RON*
1990	85,8	68,0	17,0
1991	81,6	61,9	11,7
1992	71,9	55,3	13,8
1993	67,1	51,0	12,0
1994	70,4	54,4	14,3
1995	77,1	62,7	16,5
1996	83,9	69,3	19,3
1997	76,5	66,1	16,2
1998	71,0	64,1	12,9
1999	71,1	63,1	12,6
2000	71,9	62,0	13,6
2001	77,7	66,2	16,0
2002	82,5	69,0	17,6
2003	93,0	79,5	20,0
2004	104,2	88,9	22,7
2005	111,6	97,0	26,5
2006	124,9	106,9	32,0
2007	143,8	118,3	43,4
2008	168,1	134,2	52,7
2009	155,0	122,9	37,2
2010	152,8	121,2	39,6
2011	152,9	118,8	41,4
2012	156,2	121,8	43,0
2013	160,5	122,2	38,2
2014	166,1	128,3	36,5

* Romanian currency, at the level of 1 \$ = 4.00 RON on August 5th, 2015.

Source: Statistical Yearbook of Romania- gross domestic product by category of uses, NIS, Bucharest, 2008, 2009, 2010, 2011, 2014.

Based on this information, we will analyze the existence of a dependency between the Gross Domestic Product (resultant variable y), on the one hand and the final consumption (causal variable x_1) and the gross investment (causal variable x_2).

In this context it is particularly important to specify and analyze the relationship between the three macroeconomic indicators, using a multifactor regression model (Anghelache et al., 2014). From the mathematical point of view it can be transcribed as follows:

$$y_i = a + b_1x_{1i} + b_2x_{2i} + c_i$$

To facilitate the estimation of multiple regression model we used the software Eviews 7.2, where we defined as resultant variable the Gross Domestic Product (GDP) and as factorial variables the final consumption value (CF) and gross investment (INVB). We

also thought that this regression model will contain a free term c , to reflect the influence of the terms that were not considered when building the model.

Regression model

With the instruments of the Eviews 7.2, we estimated the model parameters using the least squares in method and we subsequently tested the validity of the model, its degree of reliability and statistical significance of the parameters included.

Results obtained by using Eviews 7.2 are as follows:

Figure 1. *The results of the regression model parameter estimates*

Dependent Variable: PIB				
Method: Least Squares				
Date: 07/24/15 Time: 02:17				
Sample: 1990 2014				
Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.143838	5.405568	-0.396598	0.6955
CF	1.163113	0.152743	7.614816	0.0000
INVB	0.324933	0.344446	0.943350	0.3557
R-squared	0.983080	Mean dependent var	107.1040	
Adjusted R-squared	0.981542	S.D. dependent var	37.53240	
S.E. of regression	5.099152	Akaike info criterion	6.208192	
Sum squared resid	572.0297	Schwarz criterion	6.354457	
Log likelihood	-74.60240	Hannan-Quinn criter.	6.248760	
F-statistic	639.1268	Durbin-Watson stat	0.273984	
Prob(F-statistic)	0.000000			

From the above diagram, provided by the analysis software, the multiple regression model that describes the relationship between the three macroeconomic indicators can be written under the following form:

$$\text{GDP} = -2.143838 + 1.163113 \cdot \text{CF} + 0.324933 \cdot \text{INVB}.$$

It is noted that, for an increase in final consumption by one million RON, GDP will increase by 1,163,113 RON, while maintaining the other variable constant, and in the case of gross investment, the difference is much smaller, being able to find that, in Romania, every million RON invested only bring an increase of 0,324933 million RON of the GDP, provided that other factor included in the model remains constant.

There is therefore a direct relationship between GDP and final consumption, gross investments in Romania respectively in the period 1990-2014.

It should be noted that the free term value can be significantly lower compared with single factor analysis based on the same type of model, which allows us to conclude that the use of multifactor regression models is recommended to be included in such macroeconomic analysis, and generally, in all analyses approaching macroeconomic indicators and evolutions/forecasts.

From the point of view of statistical tests that verify the accuracy of the econometric model considered, it can be seen that the values of tests R^2 and R^2 - adjusted are high ($R^2 = 98.31\%$ and R^2 adjusted = 98.15%), allowing us to conclude that the model is correct and with a minimum risk for economic analysis. We can also notice that the introduction, in the model, of additional factor variable can lead to an increase in its likelihood when compared with a simple linear regression.

The determination report shows that 98.31% of the variation of the GDP is explained by the simultaneous variation of final consumption and gross investment in Romania during 1990-2014, suggesting a strong link between endogenous variable and the two exogenous variables, as confirmed by adjusted determination coefficient (adjusted R-squared = 0.9815), which takes into account the number of observations (25) and the number of exogenous variables (2). The correlation report ($R = 0.98308$), tending towards unit value 1, demonstrates that the estimated regression model approximates the observation data very well, with high reliability.

We can safely say that the model is statistically significant after applying the F - statistic test, as its value is more than the table-based reference, used to test the validity of econometric models. Also, the proposed model is valid, having a zero significance level Prob (F-statistic), much lower than 5%.

For each independent variable and constant, Eviews reported the standard error of the coefficient, the t-statistic test and the associated probability. Working at the level of relevance 5%, the probability attached to the statistical t-test is below that level only for “final consumption” exogenous variable. Free term coefficient is not significant because the probability attached to the statistical t-test is higher than 5% significance threshold.

Conclusions

From the methodological standpoint, it can be seen that the use of multifactor regression model allows the researcher to draw conclusive results in macroeconomic analysis, without stating that single factor regression models does not allow relevant observations on the evolution of the national economy.

In view of the aforementioned considerations, it can be appreciated that the model chosen can be representative to describe the impact that final consumption and gross investment have on GDP growth.

Multiple regression analysis has followed the evolution of GDP in terms of changes in consumption and investment in Romania during 1990-2014. It helped us to outline a linear relationship between the studied variables. The multiple regression model estimated proved to be one of precise character, as it has a high ratio of determination $R^2 = 0.98308$, so GDP is explained nearly 98.31% by the independent variables included in the model.

Based on all the comments made following the analysis of Romania's GDP by using multiple regression models, we conclude that this indicator is significantly influenced by changes in final consumption and gross investment.

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A survey of the effect of trade openness size on inflation rate in Iran using ARDL

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Abstract. *The purpose of this study is to examine the relationship between trade openness size and inflation rate in Iran using ARDL method for the period 1973 to 2010. There is a robust negative relationship across countries, first documented by Romer (1993), between a country's openness to trade and its long-run inflation rate. Given that Iran's economy is dependent on oil incomes and as these incomes influence on inflation, non-oil trade openness has been used in this study. The results show that this variable has negative significant effect on inflation through this period. Other control variables i.e. Growth of Liquidity, exchange rate and output gap affect inflation in the expected directions.*

Keywords: Openness; Globalization; Inflation; Exchange Rate.

JEL Classification: E31; F43; F14; F41.

Introduction

Macroeconomic variables such as output and inflation and factors influencing them are some of the concerns of economists in recent decades. High rates of inflation can cause inefficient trading and profiteering waste of resources, as well as distortion in rational economic decisions that damages the credibility of government policies. High levels of inflation as a sign of underlying problems in macroeconomic management make short economic horizons and financial instability. Inflation also distorts the functioning of the price mechanism. The evidence from various studies on developing countries suggests that relative prices tend to become more volatile as inflation rises even where indexation is prevalent, partly because many governments attempt to protect certain segments of the population from inflation through selective price control measures. In addition, high inflation tends to be more volatile over time. The variability of inflation – both between sectors and over time – makes it difficult to plan ahead and diverts resources away from productive uses (Ashra, 2002).

Tobin (1972) believes that inflation greases the wheels of the labor market. Friedman (1977) argues that high inflation usually associated with more volatility in price changes, which cause fluctuations in the prices and payment. Inflation exists in all countries but it is more in developing countries because of their situations in global economy and their economic structure. Inflation is a big problem in Iran through 3 decades, which is a developing country (Delavari and Rafieeyan, 2012). So that the average inflation rate during 1971 was approximately 13%, 17 per cent in 1981, 23 percent in 1991, and 14.8 percent in 2001. The remarkable thing is that despite the definition of inflation, there is no consensus about its causes. Due to the complexity of inflation and its causes it is differ from one country to the other and from period to period. Therefore very various and numerous structural and non-structural, governmental and nongovernmental factors exist. Monetary and fiscal policies, trade and foreign trade, foreign exchange and foreign policies of governments and socio-economic structures of societies are the most important factors. Dynamics of inflation has changed in the world from 1990s. The average inflation rate in the industrialized countries decreased during this decade. As this rate has been fluctuated about 2 to 3 percent in most years. These developments are not only confined to developed countries and many developing countries have also experienced changes. While high inflation was a feature of many developing economies at that time, today most of these countries have achieved lower inflation. These facts are implicitly refers to the global nature of inflation and analysts argue that it is because of globalization effects. Globalization means a rapid increase in the volume of international trade in goods, services and financial assets that may be effect on inflation in different ways. Openness to influences on the performance of the national monetary authorities in various ways. Moreover, integration of emerging economies such as China, India and Southeast Asian countries in the global trading system increase the global supply of labor, geographical relocation of production and consequently increase productivity and more specialized production based on comparative advantage. Influence of their productions to

global market, which have lower total prices due to the cheap labor, put other manufactures in the intense price competition that can prevent of price increase or lead to increase non-price competition such as innovation and productivity. Also, reducing the relative price of imported goods and services directly may reduce the intensity of the general level of prices. Globalization has created a competitive environment for manufacturers, productivity growth and wage pressures and could affect domestic prices. Relative openness to trade and foreign investment are the most important indicators of economic globalization. Developing countries such as Iran are not been able to gain significant ratio of global trade because of problems such as lack of human skills, production inefficiency, lack of changes and lack of technical expertise required to produce and export goods. Thus, the development of foreign trade can increase the level of workforce skills and capabilities in these counties and increase the level of productivity of factors of production and technological developments and provides the basis for the development of international trade and higher economic growth.

One of the channels of the impact of globalization on inflation is its impact on the relative price of imported goods. If accepted that economies such as China and India reduce the relative price of imported goods in importing countries, the deflationary effect of these countries will be subject to the continuing decline in the relative price of manufactured goods from these countries. However, it seems now, economies such as China and India face with trade surplus. This subject shows the imbalance that cannot be continued through market forces such as impact on inflation rate. In other words, the relative low cost of production in these countries is partly due to the prevention of increase in the value of money. Therefore, it is not improbable that anti-inflammatory effects of the globalization process gradually reduce through this channel. This simple example illustrates the nature and mechanisms of the impact of globalization on inflation outlook to predicts and how much vital it is. Due to the high rate of inflation, especially in recent years in Iran, it is necessary to consider the causes and origins of inflation and finding suitable strategies and policies. Reduction in trade and economic sanctions on Iran in recent years causes the sharp rise in inflation and inflation growth. Testing the impact of trade openness on inflation in the country and achieve the relationship between these two variables can be helpful for economic policy makers in adopting appropriate strategies and policies. More previous research has been done on trade openness and inflation in the country is estimated to have average of countries with different levels; these studies cannot specifically identify the differences in each country. But when the survey was done in a specific country the results will be more accurate and closer to reality.

Review of literature

One of the earliest empirical study addressing the question of the relationship between openness and inflation, although somewhat indirectly, is Triffin and Grudel (1962). Using data from six European countries during the 1950s. They propose that, among countries

that are more open and integrated, inflation generated by a monetary authority can have more of an effect on the balance of payments, than on inflation. However, they only mention in passing that this balance of payments effect can only be short-term, and they assume no optimizing behavior by the government, consumers, or firms.

The first structural model directly addressing the question of openness and inflation was designed by Rogoff (1985). His approach is to extend the Barro and Gordon (1983) framework to a two-country Mundell-Fleming model. As in Barro and Gordon, a labor market friction causes the optimal time-consistent policy of the monetary authority to be increased inflation in order to raise the level of employment. However, in Rogoff's international version, the increased inflation has an extra cost in that optimal employment is a function of the real exchange rate and that the real exchange rate depreciates with higher inflation. Thus the optimal time-consistent inflation rate chosen by a monetary authority is lower as the deteriorating effect on the exchange rate increases. More openness leads to a lower equilibrium inflation rate in this time consistent environment.

Romer's study(1993) is one of the most important studies that examine the effect of openness on inflation according to Rogoff model(1985).various studies, such as Lane (1997), Sachsida et al. (2003) and Yanikkaya (2003), have been done after Romer and supported the idea that there is a negative relationship between openness and inflation. Although Terra (1995) argued this results are confirmed only for countries with high debt during the crisis of 1980. Similarly, Batra (2001) asserted at least in the United States tariffs will not necessarily cause inflation. Gruben (2004) showed that the relationship between openness and inflation in OECD countries is not significant. Kim Beladi (2004) found a positive association between Openness and inflation for some advanced economies such as Belgium and Ireland, while this relationship was negative for other developed economies.

Al-Nasser and Sachsida (2009) examined the relationship between openness and inflation for 125 countries during 1950-1992. The results support the idea of Romer and reject the opinion of Terra.

Lin (2010) assessed the relationship between openness and inflation for 106 countries over the period 2007-1970 using panel data. The results show that the negative effect of trade on inflation is true when inflation is high, but when inflation is low, economic openness has no impact on inflation. Instead of least squares he used regression method, this method examine the relationship between inflation levels in different quarters. In his study the relationship is was negative and significant for the top quartile of inflation, and it was positive and meaningless for the bottom quartile of inflation.

Zakaria (2010) examine the relationship in Pakistan for the years 1947-2007 using time series data. His research results indicate a positive relationship between openness and inflation. Mokhtar (2010) Using multivariate co integration and vector error correction model in Pakistan for the years 1960-2007. The empirical findings indicate that the negative long-run relationship between the openness and inflation. Jafari Samimi,

Ghaderi, Sangin Abadi (2012) examined the effect of openness on inflation in Iran using ARDL method during 1973-2009. The results show that openness has negative effect in short time on inflation but this relationship is positive in long-term. In another study for MENA countries during 2000-2007 we can see that this relationship is positive for these countries.

Domestic research on the effects of globalization and openness on inflation is relatively limited. Tayyeb Nia and Zandieh (2009) studied the effects of globalization on inflation in the years 1988-2005 using regression. The results show that the more the economy is open the more it is exposed to globalization. It is expected that the influence of inflation of trade cycles is reduced and inflation volatility is lower. Moreover, the increase in the price of imported goods increases the inflation and transfers the boom and bust of the business in to Iran and affect domestic inflation. Salmanpoor et al. (2009) in a paper entitled the impact of globalization on local inflation with the use of analysis of variance examined the share of variables in inflation volatility. The results show that economy openness and import increase and export have meaningful effects on price levels, especially the share of the last variable.

Slamoueeyan, Shafiei and Jafary (2010) examined the inflation and employment growth in Iran. Their results indicate that a short-term increase in trade openness promotes economic growth and reduces inflation. But this impact on employment growth is negative. Also, the results show that long-term change in the size of one standard deviation in the variable of trade openness, does not affect the three variables.

Fattahi, Moradi, Abbaspour (2012) tested the Relationship between inflation and economic openness in using regression method for the years 1961-2007. The results show that at low inflation rates, there is no significant relationship between inflation and economic openness but in higher level there is a positive correlation between these two variables.

Studies of IMF show that globalization reduces inflation about 25% through its direct effect on non-oil import prices. The study showed that countries that are in the top tier of globalization have lower inflation rates and reverse.

ARDL⁽¹⁾ Method

In general, methods such as Engel-Granger have not validated enough for studies with small samples and small number of observations (because of ignoring the short term dynamic interactions between the variables), because the estimations are not unbiased and using t-test statistics will not be validated. (Noferesti, 1999). Thus using the methods that have short term dynamic in them are considered. Generally, a dynamic model is a model in which lags of the variables to be entered as follows:

$$Y_t = aX_t + bX_{t-1} + cY_{t-1} + u_t \quad (1)$$

In order to reduce biased in small samples, it is better to use following relationship:

$$\phi(L, P)Y_t = \sum_{i=1}^k b_i(L, q_i)X_{it} + \epsilon w_t + u_t \quad (2)$$

The above pattern is an autoregressive distributed lag model

$$\phi(L, P) = 1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_P L^P \quad (3)$$

$$b_i(L, q_i) = b_i + b_{i1}L + \dots + b_{iq}L^q \quad i = 1, 2, \dots, k \quad (4)$$

Where L is lag operator; w: vector of fixed variables such as intercept, dummy variables, time trends or exogenous variables with a constant lag. The equation should be estimated for all states and for all values means $(m + 1) k + 1$ times. M is maximum lag that is determined by the investigator, k is the number of explanatory variables. One of the equitation is selected in the next step through one of the criteria such as Akaike, Schwarz-Bayzen, Hanan- Queen or adjusted coefficient (Tashkini, 2005).

Pesaran and Shin (1995) recommend using the Schwartz - Bayesian information criteria on the interval specified by the model. Because this provision saving in the number of interrupts in order to not to miss so many degrees of freedom.

One of the advantages of this method is that regardless of the question of the model variables, I (0) or I (1) is applicable. In other words, this method does not need to divide the variables into dependent variables of zero and one (Tashkini, 2005).

Introducing the variable

Several variables are used to estimate the model used in this research. INF is the dependent variable, inflation, has been developed from the consumer price index. Openness of trade (excluding oil) is the ratio of total imports and exports of non-oil GDP without oil. MG is liquidity growth that is the most important factor affecting inflation. EXR is exchange rate growth and GAP is the output gap that is obtained using the HP - Prescott. The data used in this study for the period 1973-2010 have been extracted from the Central Bank of Iran, Iran Statistical Center and the World Bank.

The experimental results

The first step in estimating a time series model is to examine the pattern of static variables. In general, each time series is called stationary if its mean and variance are constant over time and the value of covariance between two time periods depending only on the distance or lag between the two period and it is not related to the real-time calculation of covariance. The statistics Dickey – Fuller has been used to investigate Stationarity of variables and Schwartz criterion to determine the optimal number of lags. Then, using the Vector Error Correction Model with massive breaks, long-run relationship and short-run dynamics are studied.

The dynamic form of model is as follows:

$$INF = C + \sum_{i=1}^{n_1} \beta_{1t} OPEN_{t-i} + \sum_{i=0}^{n_2} \beta_{2t} MG_{t-i} + \sum_{i=0}^{n_3} \beta_{3t} GAP_{t-i} + \sum_{i=0}^{n_4} \beta_{4t} EXR_{t-i} + \beta_5 D \quad (5)$$

Where n_1, n_2, \dots, n_4 are optimal orders for the model variables, C is intercept and D is dummy variable of revolution.

The results of estimating models as mentioned in the previous section, stationary series examination is important in estimation of time-series regression models. So at first, static variables have been examined using (ADF). The results are shown in the table below:

Table 1. Unit root test on the variable in the level

Explanation	inf	open	exr	gap	mg
Statistic for the model with intercept and no trend	-4.1331	-1.3801	-6.0873	-4.8230	-5.5852
The critical value at 5%	-2.9528	-2.9528	-2.9528	-2.9528	-2.9528
Numbers of gaps	ADF(1)	DF	DF	ADF(3)	DF

As we can see in the table above, inflation, exchange rate growth, growth of liquidity and output gaps were stable but the trade openness variable is not sustainable, thus, re- test has been done for this variable.

Table 2. Unit root test on the first difference of the non-stationary variables

Explanation	dopen
DF Statistic or the model with intercept and no trend	-5.6217
The critical value at 5%	-2.9528
Order of ADF	DF

The table shows that non-oil trade openness is stable with first difference (dopen show that first difference of open variable). So it is I(1). Given that all variables are I(1) and I(0); ARDL model can be used for estimation.

Results of the Dynamic ARDL model

Based on the study of Pesaran et al. (2001), using the ARDL method to determine the appropriate intervals, we can obtain long-term adjustment coefficients between the variables. In Johansson method, a same gap is selected for all variables while, in ARDL model optimal gaps are selected through criteria such as the Schwarz–Beyzin, Hanan Quinn, and Akaike. In the following table the results of dynamic model that was presented in the form of equation 5 through Schwarz–Beyzin is shown.

Table 3. Results of the estimation of the dynamic model ARDL (1,2,0,1,2)

Prob.	T-Ratio	Standard Error	Coefficient	Regressor
.106	1.6835	.10498	.17673	INF (-1)
.147	1.5010	10.0815	15.1320	OPEN
.990	-.012218	13.9333	-.17024	OPEN(-1)
.027	-2.3548	11.5553	-27.2107	OPEN (-2)
.001	-3.7105	.8430E-5	-.3128E-4	GAP
.002	3.4553	.029113	.10060	MG
.000	4.1090	.030964	.12723	MG(-1)
.773	.29140	.0014861	.4330E-3	EXR
.005	3.0881	.0015016	.0046370	EXR (-1)
.000	4.7003	.0015507	.0072889	EXR (-2)
.000	4.1586	2.3411	9.7359	C
.024	-2.4162	4.4878	-10.8433	D
R-Squared	.82930	R-Bar-Squared	.74767	
DW-statistic	2.0940	F(11, 23)	10.1584[.000]	
Serial Correlation	.55270[.457]	Functional Form	2.5215[.112]	
Normality	.73372[.693]	Heteroscedasticity	.76215[.383]	

As it is seen in Table 3, non-oil trade openness has negative and significant effect on inflation with two intervals. Output gap, liquidity growth and development of the exchange rate have significant impact on inflation. D is the dummy variable of revolution indicating that its effect is negative and significant. The coefficient of determination, which is 82 percent, indicates the explanatory of the model. There is no problem for consequential form, autocorrelation variance and normality. F statistic is statistically significant.

Long-term estimation

The following table shows the variables long-term coefficients. Based on the estimated coefficients non- oil trade openness has significant and substantial negative effect on inflation. So, non-oil trade with other countries reduces inflation. Growth of liquidity and exchange rate has significant positive effect on long-term inflation and the output gap, which shows that when the value of domestic production is more than potential production, the inflation increase.

Table 4. The results of Long-term estimation of coefficients of the ARDL model

Regressor	Coefficient	Standard Error	T-Ratio	Prob.
OPEN	-14.8784	7.5576	-1.9687	.061
GAP	-0.3800	0.1063	-3.5735	.002
MG	0.27674	0.051868	5.3354	.000
EXR	0.1512	0.0038175	3.9324	.001
C	11.8260	1.9943	5.9299	.000
D1	-13.1711	5.9799	-2.2026	.038

ECM test results

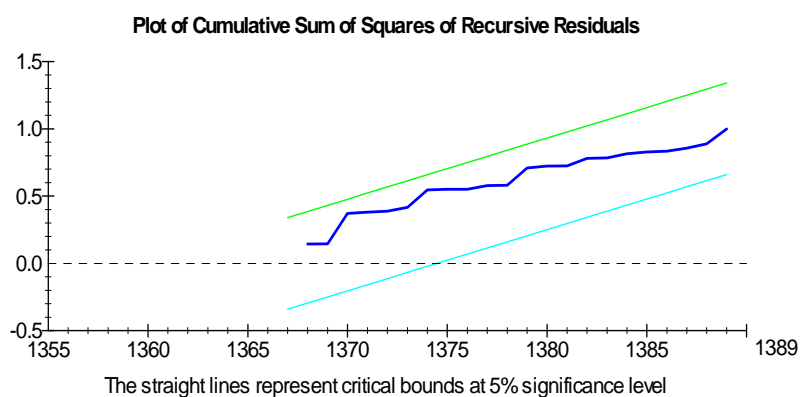
ECM model estimation results have been shown in the table below. According to this table; ECM model is statistically significant in this study that indicate the relatively high speed of adjustment. ECM significant factor indicating a long-term significant relationship between the variables in the model. Consistent with theoretical expectations, if we move from t period to period $(t + 1)$ 82/0 percentage of deviation from the path of long-term model can be corrected in the next period. In other words, any shocks or imbalances in inflation will return back to equilibrium after a period of approximately one year. So move to the equilibrium rate will be relatively high.

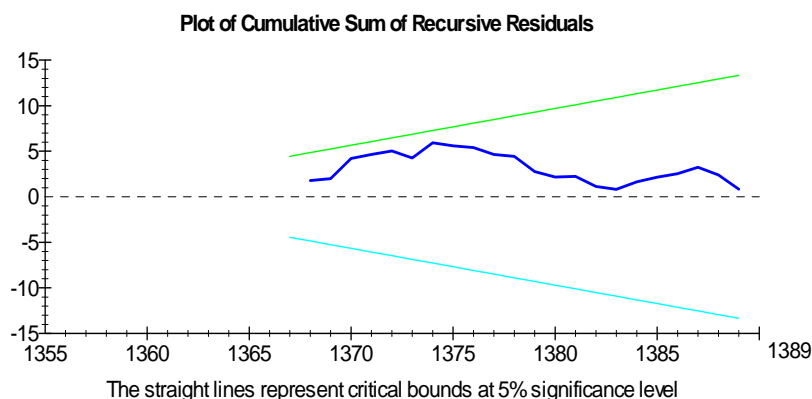
Table 5. *The results of ECM model*

Regressor	Coefficient	Standard Error	T-Ratio	Prob.
Dopen	15.1320	10.0815	1.5010	.145
dOPEN1	27.2107	11.5553	2.3548	.026
dGAP	-.3128E-4	.8430E-5	2.3548	.026
dMG	.10060	.8430E-5	3.7105	.001
dREXR	.4330E-3	.0014861	3.4553	.002
dREXR1	-.0072889	.0015507	-4.7003	.000
dC	9.7359	2.3411	4.1586	.000
dD	-10.8433	4.4878	2.4162	.023
ecm(-1)	-.82327	.10498	7.8419	.000
R-Squared	.84553	R-Bar-Squared .77165		
DW-statistic	2.0940	F-stat. 15.7367[.000]		

Stable and diagnostic tests

The stability of estimated coefficients have been examined using Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) tests. The results are shown in diagrams 1 and 2.





As it can be seen, the Cumulative Sum of Recursive Residuals does not pass of significant level of 5% and H_0 is accepted. Thus, estimated coefficients have stable structure in that period. In this test significant level is considered 5% and the results is shown in diagrams. The results are shown in digram2. As this diagram shows, the stability of the confidents is confirmed in significance level of 3%. This test is used for assessing moment ally diversion in regression coefficients.

Conclusion

This study examined the long-term and short-term effects of trade openness on inflation rate, using ARDL method. Short-term and long-term results of the estimation model suggest that trade openness variable (without oil) has a significant negative effect on inflation. With increasing trade and expanding exports and imports, foreign products with the cheaper prices and better quality are entered to the country. On the other hand, with the exposure of local products in the international market, domestic producers have to compete with similar foreign products with the production of high quality and lower price production. Thus, we can control inflation with increase in non-oil trade and the implementation of policies such as reducing import tariffs, reducing tariff barriers, improvement and development of relations with other countries. The results suggest that liquidity growth and the exchange rate have positive and significant effect on inflation and the output gap has a negative effect on inflation.

Note

(1) Autoregressive distributed lag model.

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A labor utility index to measure worker welfare and labor market performance

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Abstract. *This study develops an asymmetric labor utility index (LUI) that is determined by worker preferences for labor and leisure, based upon the target employment preference for individual workers. The welfare index is illustrated for monthly data frequency that is consistent with the current employment data, although any time increment could be used. Once the utility values are computed for a representative sample of workers in a defined region, the average of the data is used to create an aggregate labor utility index (ALUI) for the regional or national labor market. This provides an additional empirical insight into current economic performance beyond the standard U-1 to U-6 labor underutilization measures regularly computed by the United States Bureau of Labor Statistics (BLS). The U-6 provides some measure of underemployment, but it does not define a welfare measure that allows comparing the labor market performance from month to month. Moreover, none of the BLS measures account for the disutility of over-employment. We generate an index that accounts for unemployment, underemployment, and overemployment when determining the current overall aggregate labor market welfare in the region.*

Keywords: Aggregation, Labor Utility Index, Overemployment, Underemployment, Unemployment.

JEL Classification: C43, C80, J01, J40, J60.

1. Introduction

The United States Bureau of Labor Statistics (BLS) and other international organizations collect data on labor underutilization (www.bls.gov). The BLS computes the monthly variables U-1 through U-6, which provide direct measures of aggregate unemployment and underemployment⁽¹⁾. However, these variables are insufficient in two ways. First, they do not measure labor overutilization, which is a global problem, since over 20 percent of the world's workers are working more than 48 hours per week (Lee et al., 2007, p. 53). Second, these underutilization measures do not produce an individual or aggregate labor utility measure that can be tracked from over time, and that allows for international utility comparisons.

Labor underutilization correctly remains the primary focus of labor market measurement, but overwork creates both massive welfare losses and productivity losses. Previous literature suggests that mismatched work hours cause welfare losses (Golden and Gebreselassie, 2007). Using the U.S. BLS Current Population Survey (CPS) data, Golden and Gebreselassie (2007) find that underwork is a bigger problem than overwork, since only about 7% would like to work less than their current work hours, despite the resulting lower income, while 25% of their sample would prefer to work longer hours.

Overwork has consistently been a pervasive problem for Japanese workers since at least the 1960s (Weathers and North, 2009). Overwork problems in the U.S. have been popularized since Schor (1993), and have been studied globally by using a sample of 53 countries using ILO and World Bank databases (Lee et al. 2007). In the period 1990 and 2012, Peru and the Republic of Korea had the largest average working hours per person engaged, while Greece, Hungary, Japan, and the U.S. all have large average working hours (Lee et al., 2007; C.W. and A.J.K.D., 2013). Lee et al. (2007) defined excessive overtime, or long hours, as being an average workweek of more than 48 hours. In 2004-2005, about 50.9% of Peruvian workers exceeded at 48-workweek, and about 49.5% of Korean workers exceeded a 48-hour workweek (Lee et al., 2007).

Jacobs (1998) evaluates the claim that worker self-reporting of hours, such as in the U.S. CPS, are upwardly biased since workers tend to exaggerate the time they spend on the job. Jacobs (1998) concludes that the standard self-reported measure of working time is a reasonably reliable measure, and that it does not appear to overstate the workweek for individuals working long hours.

Overwork has led to at least four problems: productivity loss, workaholism, work-life balance issues, and *karoshi*, which is the most severe problem related to overwork (Kanai, 2008). In 2001, a Japanese Ministry of Health, Labor and Welfare (MHLW) medical commission found that long work hours in Japan led to both physical and mental illness (Weathers and North, 2009). The term *karoshi* includes severe mental and/or physical deterioration due to overwork. It has been used as socio-medical term in relation to workers' compensation, and includes cases of both death and permanent disability (Iwasaki et al., 2006). Hamermesh and Slemrod (2008) define workaholism "as an addiction to work that is acquired as a consequence of working early in a career, and that manifests itself as an increase in one's subsequent labor supply." Hamermesh and

Slemrod (2008) suggest that individuals may become workaholics because they develop an addiction to consumption goods that were increasingly acquired by increasing their market work. This implies that these workers have a preference for consistently working an overtime schedule.

Using data from Australia, Germany, the U.S., and Korea, Hamermesh and Lee (2007) find that additional market work generates time stress. Their study concludes that additional earnings increase time stress, controlling for hours of market work and house work. Tausig and Fenwick (2001) provide evidence that perceived employee control over work hours improves work-life balance, accounting for work and family characteristics. White et al. (2003) conclude that practices that increase work demand, such as longer actual hours worked and group work, increase negative work-to-home spillover, while practices that provide worker flexibility concerning work demands, such as control over hours worked, decrease negative work-to-home spillover. Lee et al. (2007) and C.W. and A.J.K.D. (2013) use cross-sectional data from OECD countries to show that average labor productivity falls as a country's average hours worked per person increases.

On the other end of the spectrum, Japan's economic downturn in the late 1990s and the first decade of the 2000s has led to a bipolarized trend where part of the labor force is working longer hours, and a growing number of non-regular employment where workers are part-time or temporary (Kanai, 2008). Whereas overwork may lead workers to maintain higher income and consumption levels, underemployment may lead to stress and underconsumption where the material standard of living is less than a worker's desired level.

1.1. Purpose and Scope

The purpose of this analysis is to fill in the void left by the two deficiencies in the current measures of the labor market activity: the lack of a direct welfare measure, and the failure to integrate the disutility of overemployment at the individual and aggregate level. We define the properties that a *labor utility index (LUI)* function must satisfy in order for it to serve as an appropriate measure of individual and aggregate labor market welfare, and to be pragmatically implemented within the current employment data collection system. Then, we develop a *LUI* function that satisfies these properties. Our *LUI* can be applied to each individual worker, where the welfare level is determined by that person's preferences for labor and leisure. The parameters in the *LUI* are automatically determined as a by-product of the target employment preferences that are stated by individual workers, so that the resulting statistic does not contain any arbitrary assumptions.

This *LUI* captures the welfare losses from both underemployment and overemployment. Moreover, it is asymmetrical, allowing for underemployment to cause greater decreases in worker welfare than overemployment. The welfare index is illustrated for monthly data frequency, which is consistent with the current employment data, although any time frequency could be used. Once the *LUI* values are computed for a representative sample of workers in a defined region, the average of the data can be used to create an *aggregate labor utility index (ALUI)* for any regional or national labor market. The *ALUI* allows for both time-series and cross-sectional comparisons of the aggregate welfare in the labor market.

2. Required properties of a labor welfare measure

The jobs, unemployment, and labor market data are collected and presented monthly by the U.S. BLS. Since the number of days within a month is non-standard and varies between the minimum of 28 in (a non-leap year) February, 30 days in April, June, September, and November, and 31 days in the remaining months, any measure based on a month will yield different labor hours for months of different lengths. The monthly labor welfare measurements are further complicated since a full-time job is defined as working 40 hours per week, which further is broken down as being 8 hours per workday. But, the number of weeks in a month is also non-standard due to the variance of the number of days in a month. Moreover, the definition of full-time hours during a week also varies for salaried employees depending on the number of holidays and vacation days that occur within a given week.

Property 1: The LUI must provide a consistent definition for *full-time monthly hours* and *percentage of time devoted to work* across all monthly data collection periods, and should be defined for entire range of potential hours worked.

Measuring worker's labor welfare requires reconciling the hour, day, month, and year measurement periods. Although there is not a unique reconciliation method, we will achieve this by employing a direct conversion based on a 360-day working year. The definitions used in the calculations are defined in Table 1.

Table 1. Time definitions

Time Unit	Quantity
hours in a full day	24
days in a working month	30
working months in working year	12
days in a working year	360
days in a week	7
weeks in a working year	51.4285714
days in a full-time workweek	5
hours in an full-time workday	8
hours in a full-time working month	171.4285714
average hours worked per full day	0.238095

There are 24 hours in a full day, and 7 days in a week. Define one working month as consisting of 30 days, where there are 12 working months in a 360-day working year. Let H_t denote the actual number of hours worked in month t . The labor hours per month are $H_t = 0$ if the individual is unemployed for the entire period. The maximum potential workload is $H_t^{Max} = 720$ hours per working month, in which case an individual would be working 24 hours per day for the entire 30 days (if it were physically possible).

Under this definition, there are $51 \frac{3}{7}$ working weeks in a working year. There are 8 hours in a full-time workday. We define a full-time workweek as 5 days, so that each week has 5 workdays and 2 leisure days. Thus, full-time workers will work an amount

given by $H_t^{Full} = 171.428571$ hours per month. That is found by calculating the following: $[(8 \text{ hours/workday}) * (5 \text{ workdays/week}) / (7 \text{ days/week}) * (360 \text{ days/working year}) / (12 \text{ months / working year})] = 171 \frac{3}{7}$.

Under this specification, a full-time worker will devote an average of 23.8095% of the time in any period to labor, and devote the remaining 76.1905% of the time to leisure. The time devoted to labor by a full-time worker is calculated as follows:

$[(8 \text{ hours/workday}) * (5 \text{ workdays/week}) / (7 \text{ days/week}) / (24 \text{ hours/day})] = 0.238095$. This means that the average full-time U.S. worker spends about 24% of their time working, and about 76% of their time on leisure. Since an actual calendar year has 365 days, the actual percentage of time devoted to labor per year is actually slightly smaller than 23.8095%.

Property 2: The welfare level generated by *LUI* function must only depend on the labor hours actually worked (H), and the optimally desired hours (H^*).

Since the *LUI* must be calculated from the data collected by labor survey in a given country or region, such as the U.S. BLS, the *LUI* cannot be framed as a model that depends upon the wage rate, working conditions, type of industry, or any other variable other than the actual and desired hours. The overall welfare level for any individual depends upon a wide variety of variables that affect consumption and labor, but these are rendered irrelevant by the single issue that is the subject of the labor survey. When an individual is surveyed, the consolidation of the wage rate, desired consumption and saving, and all the other variables determines the desired optimal level of monthly work hours for any given worker. The desired labor hours thus encapsulates all of these factors, and simplifies the preferences within a single quantity. Given the actual monthly work hours, the level of welfare resulting from the monthly labor welfare can be determined based on the *LUI*.

Property 3: Define a continuous positive real-valued *LUI* function as $LUI(H)$: $H \rightarrow LUI$, $H \in \mathbb{R}^+$, $LUI \in \mathbb{R}^+$. In each month t , the *LUI* function must provide a unique interior *bliss point*, or welfare-maximizing combination of monthly hours worked (H^*) and labor utility index level (LUI^*), as specified as follows:

$$\exists (H^*, LUI^*) \text{ s.t. } \{(H, LUI): LUI^*(H^*) > LUI(H), \forall H \neq H^*, \\ 0 < H < 720, LUI > 0\}$$

Marginally attached workers and individuals in the labor force must determine their desired work hours and consumption spending based upon their initial endowments, job opportunities, and expected attainable future income stream. Rational individuals know that higher levels of consumption spending require more labor hours in order to generate the necessary purchasing power. Let H^* denote a given worker's optimally desired hours in month t . Each worker will have a desired bliss point that defines the optimal balance combination of labor and leisure. Workers will achieve less than optimal welfare when they underemployed or overemployed. Thus, the *LUI* function must be designed so that it

has only one bliss point, which is the optimum level of labor hours that will uniquely provide the maximum level of welfare for any given individual in the data set.

Property 4: Given a continuously differentiable *LUI* function that satisfies *Property 3*, the individual's labor utility should continually decrease as the difference between the *actual hours worked*, and the *optimal number of hours worked*, increases in the same direction. Thus, the first-order condition on the derivative is:

$$\frac{dLUI(H)}{dH} > 0 \quad \forall \quad H < H^*, \text{ and } \frac{dLUI(H)}{dH} < 0 \quad \forall \quad H > H^*, 0 < H < 720.$$

Under *property 4*, the greater the level of underemployment, the greater the loss in utility. Workers who are underemployed encounter a decrease in their welfare as their number of monthly hours declines farther below their desired hours. For example, individuals who prefer to work full-time at 171 monthly hours will have a lower level of utility if their work hours are restricted to 150 hours per month, as compared to the utility level when they work 160 hour per month. Similarly, the greater the level of overemployment, the greater the loss in welfare. Suppose that a worker desires to work only full-time, but is working overtime. In that case, the level of utility will be greater when the total monthly hours is only 180 hours (still working 9 overtime hours) than when the overtime is larger, such as when the monthly labor hours are 200 (resulting in 29 overtime hours).

Property 5: Given *LUI* function that satisfies *Property 4*, the *LUI* should produce a rate of loss in utility that will continually increase as the difference between the *actual hours worked*, and the *optimal number of hours worked*, increases in the same direction. Therefore, second-order condition on derivative is:

$$\frac{d^2 LUI(H)}{dH^2} < 0 \quad \forall \quad H, 0 < H < 720.$$

Under *property 5*, the *LUI* function will be strictly concave from the origin. The *LUI* function will be relatively flat in the neighborhood close to the desired optimal number of hours worked, and will continually become relatively steeper as the level of underemployment or overemployment increases. Consider an underemployed individual that desires to work full-time at 171 hours. When *property 5* holds, the welfare level will decrease more when the number of monthly hours falls from 160 hours to 155 hours than when the number of hours falls from 170 hours to 165 hours. Similarly, an overemployed worker will suffer a greater welfare loss when the monthly hours increase from 185 to 190 than when the hours increases from 175 to 180.

This means that individuals whose actual working hours differ only slightly from desired number of hours will suffer only a very small drop in welfare. This property is crucial for capturing the true underlying properties worker utility. Underemployed workers who only work hours that are slightly below full-time can make budgetary changes with minor alterations in consumption so that the effect on utility and well-being is very small. However, individuals that suffer large levels underemployment encounter large budget shortfalls, and are forced into drastic reductions in consumption.

Additional levels of overemployment impose larger utility losses as workers begin to spend large fractions of their time at work. Work-life balance conditions diminish much faster when individuals work large amounts of overtime, rather than just a few hours over the optimal preference. If the required overtime continues to increase, then the employees could experience karoshi. The minimum karoshi borderline that leads severe mental and/or physical deterioration due to overwork is defined as working at least 80 hours of overtime per month (Iwasaki et al., 2006). When full-time is defined as 171 hours as in figure 1, the karoshi borderline converts to about 251 total work hours per month. Thus, individuals who are working 251 hours or more per month are suffering extreme deterioration in health and welfare. The level of utility therefore declines much faster as for monthly labor increases, given that the initial level of overemployment is already large.

Property 6: Based on the fact that individuals experience karoshi (severe physical and mental deterioration) when working over 80 hours of overtime per month, the *LUI* should obtain a maximum at $(H^*, LUI^*) \forall H, 0 < H < 720$, but should primarily be analyzed for economic scenarios where $H^* < 251$ monthly hours.

Property 7: The *LUI* should be asymmetric around the desired optimal level of monthly work hours (H^*), such that any given quantity of underemployment generates lower welfare level than the identical quantity of overemployment. Thus, for any positive real number $\varepsilon > 0$,

$$LUI(H^* - \varepsilon) < LUI(H^* + \varepsilon) \text{ where } \{ H: 0 < H < 720; 0 < H^* < 251 \}.$$

The primary barometer of macroeconomic performance and the current state of a region's economy is the level of underemployment. The foregone output production due to underemployment creates a loss for the economy, whereas overemployment does not result in any loss in potential output. For individuals, the lack of resources for consumption and saving that result from underemployment are more severe than the foregone leisure that results from an equivalent amount of overemployment. Overemployed individuals who only work a small amount of overtime can rearrange their schedules so that the extra consumption largely offsets the welfare losses in leisure time. Moreover, paid labor hours are generally more flexible downward than upward.

Property 8: Given any utility maximizing desired labor hours, $0 < H^* < 720$, The *LUI* should have a maximum value of $LUI^* = 1$, so that maximum utility level for any worker in the survey is 100%.

Property 9: Given any utility maximizing desired labor hours, $0 < H^* < 720$, The *LUI* should have a minimum value of $LUI^{min} = 0$, so that minimum utility level for any worker in the survey is 0%. Moreover, this minimum value should be obtained under two cases: unemployment, and when a worker is working the theoretical maximum (but physically impossible) amount of 720 monthly hours. This requires that $LUI(0) = LUI(720) = 0$.

Property 9 ensures that any individual who desires to work for any number of hours, and who is unemployed, will receive no utility from the attempted participation in the labor market. Also, any individual who works at every moment (if it were possible), and thus

has no time to devote to leisure, will experience no utility. Properties 8 and 9 allow for an aggregate labor market index to be constructed. In order to compare the utility across equally weighted persons, each unemployed individual must have 0 utility, and each individual who is working their personally preferred optimal amount of hours must have a 100% satisfaction level.

3. Index derivation for individual workers

This section derives an *LUI* function that satisfies the seven properties in the previous section. Although this function does not uniquely satisfy these conditions, it is the simplest such function, due to two advantages. First, it has only one parameter, which is internally defined based on an individual's desired work hours. Second, it is relatively easy to compute, and thus it can be programmed by the data collectors so that the *LUI* number for each individual in the survey is automatically generated as soon as the actual and desired labor hours are entered into the database.

Let H_t^* denote a given worker's optimally desired hours in month t , and let λ represent the optimal percentage of given month devoted to labor as determined by a worker's preference. The worker's welfare maximizing percentage of time devoted to labor is

$$\lambda_t = \frac{H_t^*}{H_t^{Max}} \quad 0 < \lambda < 1 \quad (1)$$

The value for λ cannot equal 0, since would mean that the worker would drop out of the labor force. The value for λ cannot equal 1, since would mean that the worker is working every moment of the day, which is physically impossible. The simplest *LUI* which captures a person's preferences while satisfying all 9 properties can be expressed as follows.

$$LUI(H_t) = \left[\frac{H_t}{H_t^{Max}} \right]^\lambda \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{1-\lambda} + \left[\frac{H_t}{H_t^{Max}} \right]^\lambda \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{1-\lambda} \quad (2)$$

$$+ \left[1 - (\lambda)^\lambda (1-\lambda)^{1-\lambda} \right] \quad 0 < \lambda < 1$$

There will always be a unique maximum value for the *LUI* index, and it will occur at $LUI^* = LUI(H^*) = 1$ for $0 < H^* < 720$. This scales the index so that maximum welfare level for every worker is 1, regardless of the individual's optimal labor preference. Thus, the index satisfies *property 3* and *property 8*. The *LUI* also satisfies *property 9*, since $LUI(0) = LUI(720) = 0$. Therefore, any individual with no labor hours, or no leisure hours, experiences 0 utility.

The index is asymmetric for all values of λ except for $\lambda = 0.5$. The value $\lambda = 0.5$ corresponds to a desired optimal monthly labor hour value of $H^* = 360$. This would require a person to work a 12-hour workday every day with no vacation days in a month.

The minimum border for karoshi to occur is 251 hours per month, which is far less than 360 hours. Thus, the *LUI* in equation (2) satisfies the asymmetry condition in *property 7* over the values $0 < H^* < 360$, which includes the relevant hourly range of $0 < H^* < 251$, where any value of $H > 251$ leads to extreme health issues due to overwork. This insures that the *LUI* function provides a greater penalty for underemployment than for overemployment for all desired monthly labor hours in the range $0 < H^* < 251$.

There are three general preferences that can occur for workers in the labor force. These cases include: (1) workers who desire to work full-time; (2) workers desire to work part-time; and (3) those who desire to work overtime.

3.1. Case 1: Full-Time Work Preference

Figure 1 and table 2 consider case (1) where individuals optimally desire to work full-time, and maximize their welfare by working the full-time amount 8 hours per day during each day of a 5-day workweek. This is represented by

$$\lambda_t = \frac{H_t^*}{H_t^{Max}} = \frac{171.4285714}{720} = 0.238095 \quad (3)$$

As shown in figure 1, workers who prefer to work full-time for 8 hours during each workday will desire to work 171 hours per month. If a worker actually works 171 hours during the month, then their welfare level is *LUI* = 1. If the individual is unemployed for the month, then their welfare level is *LUI* = 0.

Figure 1. Full-time Labor Preference

Worker that prefers to work 8 hours per workday: $H^* = 171.428571$; $\lambda = 0.238095$

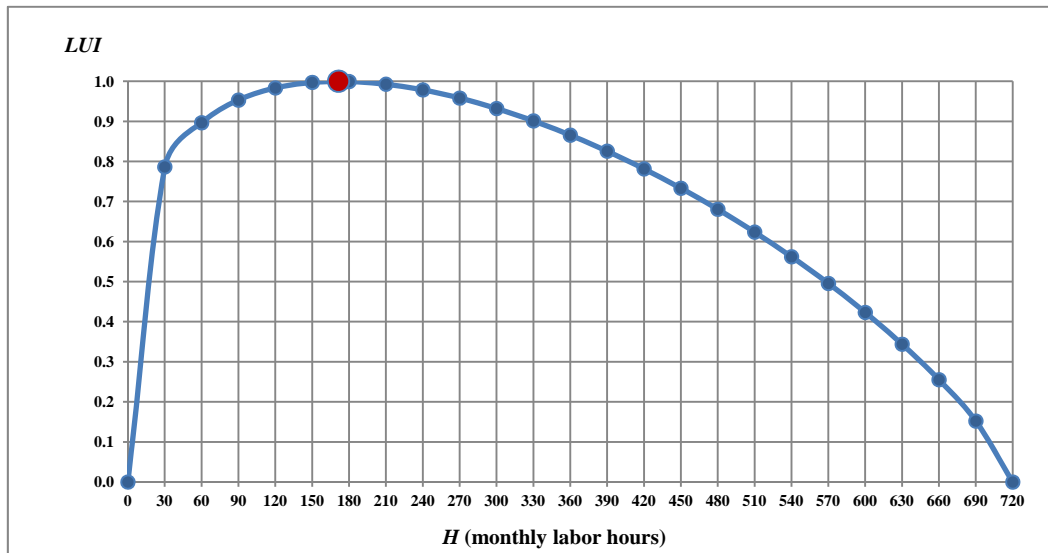


Table 2. *Full-time Labor Preference*

Worker that prefers to work 8 hours per workday: $H^* = 171.428571$; $\lambda = 0.238095$

H	LUI
0	0.0000
131.4286	0.9904
151.4286	0.9977
171.4286	1.0000
191.4286	0.9980
211.4286	0.9923
720	0.0000

The index embodies a designed asymmetry that assigns a greater penalty for welfare losses due to underemployment than for welfare losses due to overemployment. If the worker is underemployed and only works for 131 hours, which 40 hours less than the desired level of employment, then the welfare level is $LUI = 0.9904$. Alternatively, if the worker is overemployed and works for 211 hours, which 40 hours more than the desired level of employment, then the welfare level is $LUI = 0.9923$. This illustrates the fact that each hour of underemployment relative to the optimum preference will diminish worker utility more than each hour of overemployment, as specified in *property 7*.

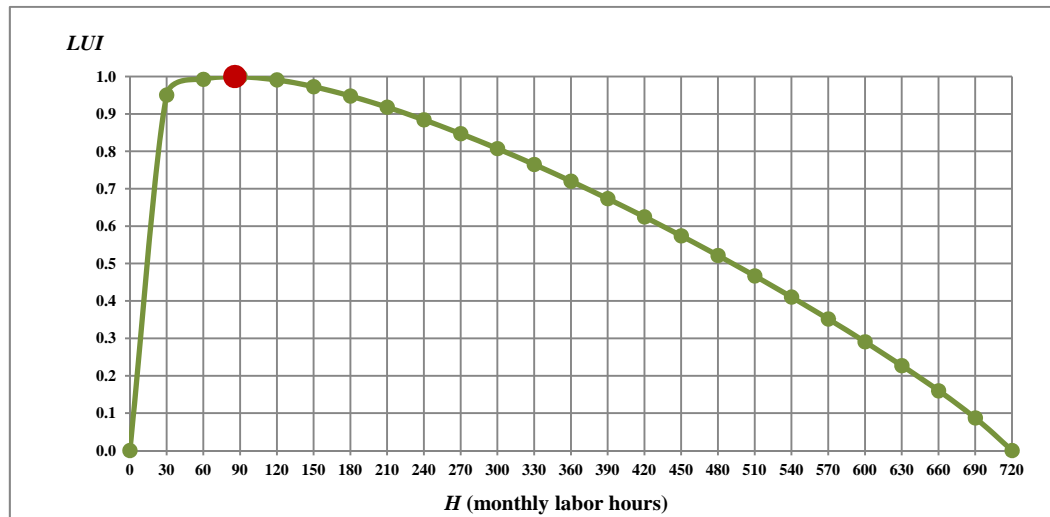
In addition, utility decreases by the larger amount of 0.0057 when the labor hours increase from 191 to 211 hours as contrasted with the smaller amount of 0.0020 when the hours increase from 171 to 191 hours. Furthermore, the utility decreases by the larger amount of 0.0096 when the labor hours decrease from 151 to 131 hours than smaller amount of 0.0023 when the hours increase from 171 to 151 hours. This demonstrates that the LUI function is strictly concave from the origin, so that *property 4* and *property 5* are satisfied.

3.2. Case 2: Part-Time Work Preference

Case (2) includes all workers who desire to work part-time. Figure 2 and table 3 show the case of workers who desire to work 4 hours per workday, which translates into about 85.7 hours per month. When an individual actually works 85.7 hours during the month, then their welfare level is $LUI = 1$. When these workers are unemployed for the month, then their welfare level is $LUI = 0$.

Figure 2. *Part-time Labor Preference*

Worker that prefers to work 4 hours per workday: $H^* = 85.1428571$; $\lambda = 0.119048$

**Table 3.** *Part-time Labor Preference*

Worker that prefers to work 4 hours per workday: $H^* = 85.1428571$; $\lambda = 0.119048$

H	LUI
0	0.0000
45.7143	0.9793
65.7143	0.9957
85.7143	1.0000
105.7143	0.9967
125.7143	0.9883
720	0.0000

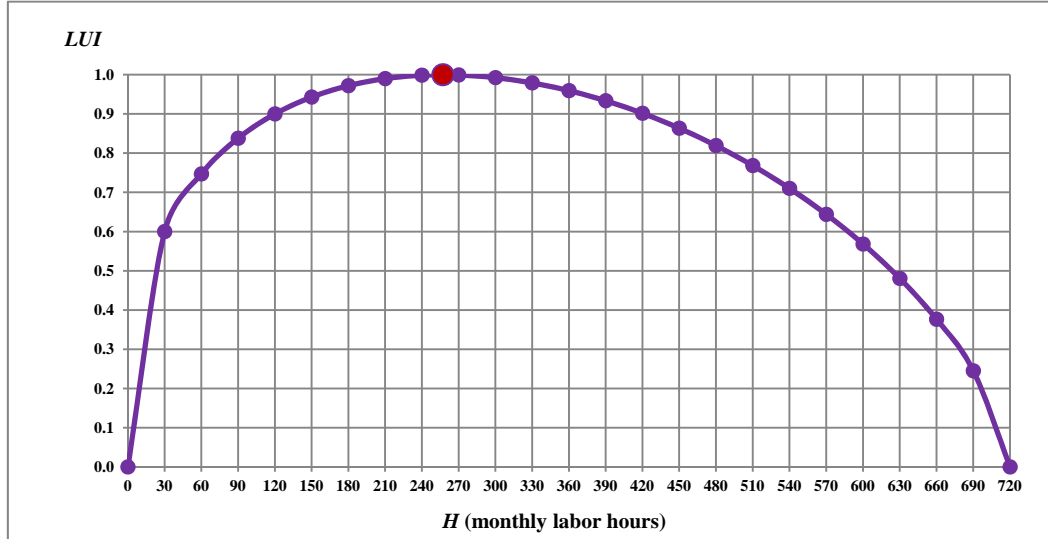
The index again demonstrates the asymmetry that results in larger welfare losses for underemployment than during situations of overemployment. If the worker suffers an episode of underemployment and only works for 46 hours, which 40 hours less than the desired level of employment, then the welfare level is $LUI = 0.9856$. Alternatively, if the worker is overemployed and works for 126 hours, which 40 hours more than the desired level of employment, then the welfare level is $LUI = 0.9919$.

3.3. Case 3: Overtime Work Preference

The third category includes all workers who desire to work overtime. Figure 3 and table 4 show the case of workers who desire to work 12 hours per workday, resulting in about 257 hours per month. Actually working 257 hours during the month leads to the welfare level $LUI = 1$. When these workers are unemployed, the welfare level is $LUI = 0$.

Figure 3. *Overtime Labor Preference*

Worker that prefers to work 12 hours per workday: $H^* = 257.1428571$; $\lambda = 0.357143$

**Table 4.** *Overtime Labor Preference*

Worker that prefers to work 12 hours per workday: $H^* = 257.1428571$; $\lambda = 0.357143$

H	LUI
0	0.0000
217.1429	0.9929
237.1429	0.9983
257.1429	1.0000
277.1429	0.9984
297.1429	0.9936
720	0.0000

Situations of underemployment where the individual only works for 217 hours, which is 40 hours less than the desired level of hours, correspond to a welfare level of $LUI = 0.9929$. Overemployment where an individual works for 297 hours, which 40 hours more than the desired level of employment, corresponds to a welfare level of $LUI = 0.9936$. Thus, this case again demonstrates the asymmetry of the employment gap whereby a given number of hours of underemployment is penalized more than the same number of hours of overemployment.

In summary, the LUI function will always have a maximum value of $LUI = 1.0$ whenever the individual works the desired number of hours. When workers prefer to spend less than half of their time working, then $\lambda < 0.5$ and the desired number of hours is $H^* < 360$. For all of these cases, the LUI will be asymmetric and will assign larger penalties for underemployment than for overemployment. This includes all of the cases above, including the overemployment case 3, where a consistent 12-hour workday for each 5-day

workweek resulted in the individual working 297 hours per month. The only case where there the *LUI* would be symmetric occurs when workers prefer to spend half of their time working, so that $\lambda = 0.5$ and the desired number of hours is $H^* = 360$. Although this last case is of theoretical interest, it does not have a practical application, since the optimal level of hours would be less than $H^* < 251$, due to human physical and mental health restraints.

As the desired number of hours decreases, both H^* and λ will fall. When the desired quantity of labor hours approaches 0, then $H^* \rightarrow 0$, $\lambda \rightarrow 0$. The *LUI* is undefined for $\lambda = 0$; this is consistent with the U.S. BLS data definitions, since any worker who does not desire to work is classified as not in the labor force.

The response of an individual's *LUI* to a change in number of hours worked can also be expressed. Consider a worker with fixed labor preference parameters H^* and λ , where $0 < \lambda < 1$. Whenever the actual level of hours worked changes, the resulting change in the welfare level will be determined by the first derivative of equation (2), which is given in equation (4):

$$\begin{aligned} \frac{dLUI(H_t)}{dH_t} = & \frac{\lambda H_t^{\lambda-1}}{(H_t^{Max})^\lambda} \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{1-\lambda} - \frac{(1-\lambda)H_t^\lambda}{(H_t^{Max})^{\lambda+1}} \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{-\lambda} \\ & + \frac{\lambda H_t^{\lambda-1}}{(H_t^{Max})^\lambda} \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{1-\lambda} - \frac{H_t^\lambda}{(H_t^{Max})^{\lambda+1}} \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{-\lambda} \end{aligned} \quad (4)$$

Equation (4) shows that equation (2) satisfies the first derivative condition in *property 4*, and this fact is illustrated in figures 2 – 4. Thus, the *LUI* function is has a positive first derivative when $H < H^*$, and a negative first derivative when $H > H^*$.

The second derivate of equation (2), which is the first derivative of equation (4), is given by equation (5) as follows:

$$\begin{aligned} \frac{d^2 LUI(H_t)}{(dH_t)^2} = & \frac{\lambda(\lambda-1)H_t^{\lambda-2}}{(H_t^{Max})^\lambda} \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{1-\lambda} - \frac{\lambda H_t^{\lambda-1}}{(H_t^{Max})^{\lambda+1}} \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{-\lambda} \\ & - \frac{\lambda(1-\lambda)H_t^{\lambda-1}}{H_t^{Max}} \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{-\lambda} - \frac{\lambda(1-\lambda)H_t^\lambda}{(H_t^{Max})^{\lambda+2}} \left[\frac{H_t^{Max} - H_t}{H_t^{Max}} \right]^{-(\lambda+1)} \end{aligned} \quad (5)$$

$$\begin{aligned}
& + \frac{\lambda(\lambda-1)H_t^{\lambda-2}}{(H_t^{Max})^\lambda} \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{1-\lambda} - \frac{\lambda H_t^{\lambda-1}}{(H_t^{Max})^{\lambda+1}} \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{-\lambda} \\
& - \frac{\lambda H_t^{\lambda-1}}{(H_t^{Max})^{\lambda+1}} \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{-\lambda} - \frac{\lambda H_t^\lambda}{(H_t^{Max})^{\lambda+2}} \left[\left(\frac{H_t^{Max} - H_t}{H_t^{Max}} \right) \left(\frac{1}{1-\lambda} \right) \right]^{-(\lambda+1)}
\end{aligned}$$

Property 6 requires that the *LUI* must be strictly concave, such that its second derivative is always negative. Note that $0 < \lambda < 1$, so that $(1 - \lambda) < 0$. Thus, all eight terms in equation (5) are negative, and this ensures that *property 6* is satisfied. This strictly concave curvature of the *LUI* function is also illustrated in figures 1 – 3.

3. The Aggregate Index

The *LUI* can be computed by the data collection agency by obtaining the answers to two questions for all workers in the labor force. The first question is “How many hours did you desire to work?” The second question is “How many hours did you work?” Based on the answers to these two questions, the researcher can determine H^* , λ , and LUI_{it} for each individual i who is in the labor force in period t .

Then, the monthly Aggregate Labor Utility Index (*ALUI*) can be computed by averaging the individual LUI_{it} values. Let n be the number of individuals in the labor force in a given sample, where the individuals are numbered $i = 1, \dots, n$. The aggregate labor utility index value for month t is given by equation (6).

$$ALUI_t = 100 \frac{\sum_{i=1}^n LUI_{it}}{n} \quad i = 1, \dots, n \quad 0 < ALUI_t \leq 100 \quad (6)$$

The larger the value of the $ALUI_t$, the better the economic performance of the labor market in month t . This aggregate index can be compared across regions, demographic groups, countries, and over time. Since the *LUI* in equation (2) satisfies *property 8*, the maximum value is $ALUI_t = 100$. This would occur if every person in the labor force was working their optimally desired number of hours, so that $LUI_{it} = 1$ for each worker, $i = 1, \dots, n$. Since *property 9* is satisfied, the minimum value is $ALUI_t = 0$. This would occur if every individual were unemployed, since this would result in $LUI_{it} = 0$ for each worker, $i = 1, \dots, n$.

The *natural unemployment rate*, where only normal frictional job turnover is present, is about 5% for the United States labor force. If 5% of the workforce is unemployed, and the remaining individuals are each working their optimally desired number of hours, then the aggregate index will have the value $ALUI_t = 95$. Thus, the largest upperbound value that the aggregate index that could consistently be achieved in the U.S. over the long-run is 95.

Consider the following examples. Suppose that there are an equal number of case (1), case (2), and case (3) workers. Assume that half of the case (1) workers are working full-time at $H^* = 171.4$ monthly hours, and the other half are 40 hours underemployed, working only 131.4 hours. Assume that half of the case (2) individuals are 40 hours underemployed, and are working 45.7 monthly hours; and, the other half are working 125.7 hours, and thus are overemployed by 40 hours relative to their preference. Finally, assume that half of the case (3) individuals are working 217.1 hours (40 underemployment hours), and the other half are working 297.1 hours (40 overemployment hours) per month. In this example, the aggregate index would be given by $ALUI_t = 99.0737$.

All else constant, if the underemployed workers in the case (1) group were unemployed, rather than just underemployed, then the index would be $ALUI_t = 82.5669$. This demonstrates that unemployment will have a significant impact on the index. All else constant, if these same case (1) workers who were originally underemployed were working 211.4 monthly hours (which is 40 overemployment hours), then the index value would be $ALUI_t = 99.1049$.

4. Conclusion

The employment data collection agencies, such as the U.S. BLS, can directly measure the current welfare level of a given regional or national labor market that incorporates the dual allocation problems of underemployment and overemployment. This requires having each worker answer two questions within the monthly survey regarding the specifics of (1) the number of hours worked during the month, and (2) the desired number of hours of monthly work. Data on the number of hours per worked per month is already collected internationally by various agencies, including the U.S. BLS CPS; and, Jacobs (1994) concluded that worker's self-reported data on workings is reasonably reliable. The desired number of monthly hours worked data does not provide any *a priori* reasons to believe that it would be biased, although follow-up studies would be recommended, once the question is implemented. After collecting the monthly data from the answers to these two questions, the methods developed in this paper can then be employed to obtain the *LUI* for each individual in the survey. These *LUI* statistics can be used to compute the aggregate *ALUI* measures that can track the labor market over time, thus providing information on economic performance for workers as an aggregate and for subgroups based on regional demographic characteristics.

Note

- (1) The BLS defines U1-U6 as follows: "U-1: Persons unemployed 15 weeks or longer, as a percent of the civilian labor force; U-2: Job losers and persons who completed temporary jobs, as a percent of the civilian labor force; U-3: Total unemployed, as a percent of the civilian labor force (official unemployment rate); U-4: Total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers; U-5: Total unemployed, plus discouraged workers, plus all other persons marginally attached to the labor force, as a percent of the civilian labor force plus all persons marginally attached to the labor force; U-6: Total

unemployed, plus all persons marginally attached to the labor force, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all persons marginally attached to the labor force.”

Source: <http://www.bls.gov/news.release/empst.t15.htm>. Retrieved on 2-22-2015.

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Financial development and economic growth in emerging market: bootstrap panel causality analysis

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Abstract. *In this study, it was investigated whether there is a causality relationship between financial development and economic growth in emerging market countries. Data from the period between 1988 and 2013 was analyzed using the bootstrap panel causality test, which takes cross-section dependence and heterogeneity into account. The results of the test showed that there is a weak causal relationship between economic growth and financial development support the neutrality hypothesis in emerging countries, except for Turkey.*

Keywords: Financial Development, Economic Growth, Emerging Market, Panel Bootstrap Causality.

JEL Classification: C33, F43, O16, O52.

1. Introduction

The relationship between financial development and economic growth was first discussed by Bagehot (1873) and Schumpeter (1911) and then examined and debated through a more comprehensive approach in the studies conducted by Goldsmith (1969), McKinnon (1973) and Shaw (1973). Today, the relationship between these two variables is still being studied and discussed. What makes the relationship between financial development and economic growth important is that these two variables provide insight regarding how much priority needs to be given to reforms concerning the financial sector in developing countries, especially where financial institutions are not adequately developed and organization and auditing systems are weak. Another factor that makes the aforementioned relationship important is that the level of development in financial markets partly clarifies why countries grow at different rates.

There are certain risks that savers face when they aim to turn their savings into investments. These are liquidity and efficiency risks. Liquidity risks emerge because of the uncertainty in turning assets into cash. Efficiency risks occur due to the shocks experienced throughout the production process that keep risk-avoiding individuals away from investing in firms (Levine, 1997). Financial institutions protect investors from such risks through the investment tools they develop. The risk-spreading ability of financial markets contributes to economic growth by shifting portfolio investments to projects with higher expected returns (Obstfeld, 1994). Furthermore, developed banking systems decrease the asymmetric information between the company and the bank. In addition to these, financial institutions collect savings from units that have fund surplus and distribute these savings to units that need funding and thus meet the needs of both parties (King and Levine 1993a).

When scholars consider both theoretical and empirical studies, they can group the hypotheses that explain the relationship between financial development and economic growth under four titles. The first is the “supply-leading hypothesis” pioneered by Schumpeter (1911) and developed by Patrick (1966), which argues that financial development has a rather large and positive effect on economic growth. Here, financial intermediation contributes to growth by increasing the effectiveness of capital accumulation, savings and, accordingly, investment rates.

The second hypothesis that explains the relationship between financial development and economic growth is the “demand-following hypothesis,” which was first put forward by Robinson (1952) and states that financial development follows economic growth. This hypothesis states that the demand for financial services will increase as the real part of the economies of countries develops. This hypothesis can be summarized as “entrepreneur leads and finance follows.”

Third, the bidirectional causality hypothesis is a combination of the supply-leading and demand-following hypotheses. It postulates that financial development and economic growth are mutually or bidirectionally causal (see Table 1). Financial development gradually induces economic growth and this, in turn, causes feedback and induces further financial development.

The fourth is the theory put forth by Lucas (1988), who states that there is a very weak or no causality relationship between financial development and economic growth. This theory is stated as the “neutrality hypothesis.”

The aim of this study is determine if there is a relationship between financial development and economic growth in emerging countries. The study is a causality analysis. Although there are various empirical studies on the relationship between financial development and economic growth, this study differs from studies in the literature in terms of method and scope. For the assumption of cross-sectional independence and heterogeneity are difficult to satisfy in panel data, neglecting this information causes bias and inconsistency in empirical results (Bai and Kao, 2006). The method used in this study developed by Konya (2006) is unlike from the previous studies accounts for cross-sectional dependency and cross country heterogeneity in the empirical modeling.

Financial development is a comprehensive term. Therefore, proxy preference is of great importance for studies on financial development. Incorrect or inadequate preference of proxy may lead to failure results. This may also lead policy makers to make incorrect decisions. In this study, different from the majority of previous empirical studies, 5 proxies representing financial development were deployed. Besides, there are not many empirical studies about emerging markets for the periods after the years of 1980s, when the financial liberalization began to increase all over the world. Moreover, especially Turkey showed important development in financial sector in comparison to other emerging countries after the years of 2000. So, the relationship between the financial development and economic growth of Turkey may be an example for other emerging countries. Therefore, the analysis of Turkey and other emerging countries has an importance for governments of countries with similar qualifications. According to these results, policy makers can make use of the macroeconomic policies of countries with similar qualifications.

This study comprises of five sections. Following this introductory section, data and the methods used in the study are clarified in section two. Section two provides information regarding the data and the methods used in the study. Empirical findings and the economic interpretations of these findings are presented in section three. Finally, conclusion and policy suggestions are given in section four.

2. Literature review

There are various studies conducted on financial development and economic growth. The first studies on this topic were conducted by Bagehot (1873) and Schumpeter (1911). Numerous theoretical and empirical studies have been conducted in the literature following the study by Schumpeter (1912). Gurley and Shaw (1955, 1967), Bencivenga and Smith (1991), Obstfeld (1994), Bencivenga et al. (1995) can be given as examples for theoretical studies.

Table 1. *Studies about the causality between the financial development and economic growth*

Author(s)	Methodology	Country	Period	Results and findings
Ahmed and Ansari (1998)	Standard Granger causality	3 South-Asian countries: India, Pakistan, and Sri Lanka.	1973-1991	FD→EG (supply leading hypothesis)
Ghali (1999)	Cointegration, VECM causality	Tunisia	1963-1993	FD→EG (supply leading hypothesis)
Gürsoy and Al-Aali (2000)	Granger causality	Bahrain, Saudi Arabia and Kuwait	1973-1988	FD→EG (Kuwait) (supply leading hypothesis) EG→FD (Bahrain and Saudi Arabia)
Kar and Pentecost (2000)	Cointegration, VECM causality	Turkey	1963-1995	The direction of the causality between financial development and economic growth changed according to the financial development indicator.
Bhattacharya and Sivasubramanian (2003)	Cointegration, VECM causality	India	1970-1999	FD→EG (supply leading hypothesis)
Fase and Abma (2003)	Standard Granger causality	9 emerging countries: Bangladesh, India, Malaysia, Pakistan, Philippines, Singapore, South Korea, Sri Lanka and Thailand.	1974-1999	FD→EG (supply leading hypothesis)
Ghirmay (2004)	VAR, VECM causality	13 sub-Saharan African countries	1971-2001	FD→EG (8 countries) FD↔EG (6 countries)
Chang and Caudill (2005)	VAR, VECM causality	Taiwan	1962-1998	FD→EG (supply leading hypothesis)
Liang and Teng (2006)	VAR, VECM causality	Chine	1952-2001	EG→FD (supply leading hypothesis)
Shan and Jainhong (2006)	VAR, VECM causality	Chine	1978-2001	FD↔EG
Aslan ve Küçükaksoy (2006)	VAR, Granger causality	Turkey	1970-2004	FD→EG (supply leading hypothesis)
Aslan and Korap (2006)	Cointegration, VECM causality	Turkey	1987-2004	The direction of the causality between financial development and economic growth changed according to the financial development indicator.
Demir et al. (2007)	VAR, VECM causality	Turkey	1995-2005	FD→EG (supply leading hypothesis)
Ang and McKibbin (2007)	Cointegration, VECM causality	Malaysia	1960-2001	EG→FD (demand-following hypothesis)
Altunç (2008)	Cointegration, VECM causality	Turkey	1970-2006	The direction of the causality between financial development and economic growth changed according to the financial development indicator.
Yang and Yi (2008)	Superexogeneity tests, Causality	Korea	1971-2001	FD→EG (supply leading hypothesis)
Abu-Bader and Abu-Qarn (2008)	VAR, VECM causality	Egypt	1960-2001	FD↔EG
Odhiambo (2008)	Cointegration, VECM causality	Kenya	1969-2005	EG→FD (demand-following hypothesis)

Author(s)	Methodology	Country	Period	Results and findings
Kakilli Acaravci et al. (2009)	Panel GMM and causality	24 sub-Saharan African countries	1975-2005	FD↔EG
Odhiambo (2009)	Cointegration, VECM causality	South Africa	1960-2006	EG→FD
Nazlıoğlu et al. (2009)	ARDL, DL Granger causality	Turkey	1987-2007	EG→FD
Rathinam and Raja (2010)	VAR, VECM causality	India	1950-2006	FD→EG (supply leading hypothesis)
Öztürk et al. (2011)	Holt-Eakin, Newey and Rosen panel causality	9 MENA countries	1992-2009	EG→FD
Kar et al. (2011)	Bootstrap panel granger causality	15 MENA countries	1980-2007	FD≠EG
Soytaş and Küçükkaya (2011)	VAR, VECM causality	Turkey	1991-2005	FD≠EG
Ozcan and Ari (2011)	VAR, VECM causality	Turkey	1998-2009	EG→FD
Shahbaz and Lean (2012)	ARDL, VECM causality	Tunis	1971-2008	FD↔EG
Shahbaz et al. (2013)	ARDL, VECM causality	China	1971-2011	FD↔EG
Hsueh, et al. (2013)	Bootstrap panel granger causality	10 Asian countries	1980-2007	FD→EG (Malaysia, Indonesia, Korea, Singapore, Thailand, Taiwan and China) EG→FD (Malaysia) FD≠EG (Philippines, India and Japan)
Öztürk and Acaravci (2013)	ARDL, VECM causality	Turkey	1960-2007	FD→EG (supply leading hypothesis)

Abbreviations defined as follows; Economic growth or GDP (EG), Financial development (FD), Toda-Yamamoto (TY), Dolado-Lutkepohl (DL), The Economic Community of West African States (ECOWAS).

→, ↔, and ≠ represent unidirectional causality, bidirectional causality, and no causality, respectively

2. Data and methodology

The primary aim of this study is to analyze the relationship between the economic growth and financial development for the economies of 13 emerging countries (Argentina, Brazil, Bulgaria, Chile, China, Colombia, Indian, Indonesia, Malaysia, Mexico, Russia, South Africa, Thailand and Turkey) classified by Morgan Stanley Capital Index (MSCI). The MSCI emerging markets index consists of twenty three emerging countries. The analysis of the study covers annual data for the period of 1988–2013. The data were obtained from the World Development Indicator (WDI), is an electronic database of World Bank.

It is crucial that the variables selected to analyze the relationship between economic growth and financial development actually represent economic growth and financial development. The proxies that are used to represent the developments in the financial

sector can be classified in three groups: (1) monetary aggregate variables⁽¹⁾, (2) domestic and private credit value and banking variables⁽²⁾ and (3) stock and bond market variables⁽³⁾. Because a significant part of data regarding the monetary aggregate variables could not be obtained, monetary aggregates such as M1, M2 and M3 were not used in this study. In addition, stock trade data could not be obtained for the majority of the emerging markets, so the data could not be analyzed for these countries. This study employs five indicators for financial development: (i) DCB: domestic credit provided by banking sector to GDP, (ii) DCP: domestic credit to private sector to GDP, (iii) GDS: gross domestic savings to GDP, (iv) TR: total export and import of goods and services to GDP, (v) IR: real interest rate (%). The logarithmic value of Real GDP based on 2005 prices was chosen as a proxy of economic growth.

In this study, cross-section dependence and homogeneity tests were conducted, and then the causality test was performed.

2.1. Panel Causality Test

Three approaches were employed to examine the direction of causality in a panel data (Kar et al., 2011). The first approach is based on a GMM estimator. However, this approach is not able to take into account cross-sectional dependence (Pesaran et al., 1999). The second approach was developed by Hurlin (2008) for examining the causality relation in a panel data. However, this approach is not able to account for cross-sectional dependence. The third approach proposed by Konya (2006) accounts for cross-sectional dependence. Moreover, this approach is able to take into account heterogeneity (Nazlioglu et al., 2011). If cross-sectional dependency exists, it will be more efficient to use the seemingly unrelated regressions (SUR) approach instead of OLS when estimating panel data causality (Zellner, 1962). This approach, developed by Konya (2004, 2006), is more appropriate than other approaches defined previously for analyzing the causality in a heterogeneous panel.

This approach is based on SUR estimation of the set of equations and Wald tests with country specific bootstrap critical values in detecting causal relationships. Besides, the variables in the system are not supposed to be stationary, implying that the variables are used in level form irrespective of their unit root and cointegration properties, because country specific bootstrap critical values are used (Konya, 2006).

The panel causality approach of Konya (2006) can be formulated as follows:

$$\begin{aligned}
 y_{1,t} &= \alpha_{11} + \sum_{l=1}^{ly_1} \beta_{1,1,l} y_{1,t-l} + \sum_{l=1}^{lx_1} \delta_{1,1,l} x_{1,t-l} + \varepsilon_{1,1,t} \\
 y_{2,t} &= \alpha_{2,1} + \sum_{l=1}^{ly_1} \beta_{1,2,l} y_{2,t-l} + \sum_{l=1}^{lx_1} \delta_{1,2,l} x_{2,t-l} + \varepsilon_{1,2,t} \\
 &\vdots \\
 y_{N,t} &= \alpha_{1,N} + \sum_{l=1}^{ly_1} \beta_{1,N,l} y_{N,t-l} + \sum_{l=1}^{lx_1} \delta_{1,N,l} x_{N,t-l} + \varepsilon_{1,N,t}
 \end{aligned} \tag{1}$$

and

$$\begin{aligned}
 x_{1,t} &= \alpha_{2,1} + \sum_{l=1}^{ly_2} \beta_{2,1,l} y_{1,t-l} + \sum_{l=1}^{lx_2} \delta_{2,1,l} x_{1,t-l} + \varepsilon_{2,1,t} \\
 x_{2,t} &= \alpha_{2,2} + \sum_{l=1}^{ly_2} \beta_{2,2,l} y_{2,t-l} + \sum_{l=1}^{lx_2} \delta_{2,2,l} x_{2,t-l} + \varepsilon_{2,2,t} \\
 &\vdots \\
 x_{N,t} &= \alpha_{2,N} + \sum_{l=1}^{ly_2} \beta_{2,N,l} y_{N,t-l} + \sum_{l=1}^{lx_2} \delta_{2,N,l} x_{N,t-l} + \varepsilon_{2,N,t}
 \end{aligned} \tag{2}$$

Where t refers to the time period ($t=1, \dots, T$), N is the number of countries ($j=1, \dots, N$) l to the lag. In this system, each equation in the SUR system has different predetermined variables to test for Granger causality, there are alternative causal relations to be found for a country in which (1) there is one-way Granger causality from X to Y if not all $\delta_{1,j,i}$ s are zero, but all $\beta_{2,i,j}$ s are zero; (2) there is one-way Granger causality from Y to X if all $\delta_{1,j,i}$ s are zero, but not all $\beta_{2,i,j}$ s are zero; (3) there is two-way Granger causality between X and Y if neither $\delta_{1,j,i}$ s nor $\beta_{2,i,j}$ s are zero; (4) there is no Granger causality between X and Y if all $\delta_{1,j,i}$ s and $\beta_{2,i,j}$ s are zero⁽⁴⁾.

3. Empirical Findings

Before conducting the causality test developed by Konya (2006), it is necessary to test cross-section dependence and heterogeneity. Breusch-Pagan (1980) CD_{LM1} , Pesaran (2004) CD_{LM2} , Pesaran (2004) CD_{LM} and Pesaran et al. (2008) tests were used for cross-section dependence. Pesaran and Yamagata (2008) test was used for homogeneity. The results of the cross-section dependence and homogeneity tests for thirteen emerging countries are presented in Appendix 1. According to the results given in Appendix 1, it was concluded that there was cross-section dependence and heterogeneity in all three groups included in the study. Therefore, it would be possible to conduct the panel causality test of Konya (2006).

The first variable used as proxy for the financial sector is DCB. The results of the causality test between DCB and GDP for G7 countries are given in Table 2.

The results of the causality test between GDP and DCB for emerging countries are presented in Table 2.

The null hypothesis stating that there is no causality from GDP to DCB is rejected in Colombia, India, Indonesia and Turkey at 5 percent and in Chile at 10 percent significance levels. The null hypothesis is accepted in the remaining nine emerging countries. Alternatively, the null hypothesis that there is no causality from DCB to GDP is rejected for South Africa at 1 percent, for Chile, Indonesia, Thailand and Turkey at 5 percent significance levels.

Table 2. *The Results of Panel Causality Test for GDP and DCB in Emerging Market*

Countries	H ₀ : GDP does not cause DCB					H ₀ : DCB does not cause GDP			
	Wald stat.	Bootstrap Critical Values				Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%			1 %	5%	10%
Argentina	0.34	42.26	20.73	13.45		1.75	66.47	30.43	19.40
Brazil	1.20	26.16	14.24	9.43		0.28	62.32	30.89	20.21
Chile	10.09*	29.48	14.81	9.48		36.72**	67.52	34.28	22.90
China	8.51	83.58	45.36	31.34		7.84	76.18	39.37	26.20
Colombia	53.94**	77.22	42.57	29.25		9.59	92.22	43.66	28.21
Indian	28.97**	47.33	24.13	15.83		0.45	41.74	20.60	13.93
Indonesia	29.55**	35.93	17.75	11.99		36.10**	67.33	34.11	23.26
Malaysia	1.19	32.01	16.34	10.91		14.75	86.17	42.99	28.94
Mexico	1.64	57.28	28.43	19.26		0.18	48.10	24.47	16.10
Russia	2.24	26.38	14.63	10.31		1.25	34.55	17.19	11.80
South Africa	1.16	24.16	12.68	8.62		40.10***	34.17	19.52	12.80
Thailand	1.67	27.95	15.67	11.01		20.60**	23.89	11.51	7.71
Turkey	25.23**	43.50	24.60	17.87		14.60**	29.34	14.55	9.44

***, ** and * indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

Accordingly, it can be said that there is bidirectional causality between GDP and DCB in Chile, Indonesia and Turkey. In addition, it can be said that there is unidirectional causality from GDP to DCB in Colombia and India and from DCB to GDP in South Africa and Thailand. However, no causality was determined between the variables for the economies of Argentina, Brazil, China, Malaysia, Mexico and Russia.

The second variable representing the development of the financial sector for emerging countries is DCP. The results of the causality test between GDP and DCP are summarized in Table 3.

Table 3. *The Results of Panel Causality Test for GDP and DCP in Emerging Markets*

Countries	H ₀ : GDP does not cause DCP					H ₀ : DCP does not cause GDP			
	Wald stat.	Bootstrap Critical Values				Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%			1 %	5%	10%
Argentina	0.74	48.14	22.62	15.47	73.27***	64.74	32.80	21.34	
Brazil	0.67	33.18	17.08	11.69	1.47	65.60	33.93	22.12	
Chile	16.68	106.52	58.55	43.09	30.77*	82.48	41.03	26.82	
China	4.81	53.05	27.35	18.88	3.52	79.51	40.14	26.94	
Colombia	3.08	28.60	14.52	9.68	1.03	84.90	40.05	26.24	
Indian	44.52*	94.73	53.01	38.40	0.56	38.01	18.85	12.36	
Indonesia	2.95	42.97	18.12	11.91	4.63	100.59	46.83	30.46	
Malaysia	0.67	41.93	19.72	13.14	2.14	62.16	30.56	21.12	
Mexico	0.43	38.38	19.58	13.12	5.43	59.81	29.91	19.26	
Russia	0.70	28.80	14.11	9.47	11.81*	25.45	13.27	8.93	
South Africa	0.72	27.54	14.53	9.71	18.17**	33.37	17.80	12.33	
Thailand	0.86	26.97	15.22	10.76	16.72**	21.15	11.13	7.80	
Tunisia	1.19	18.23	9.55	6.40	2.21	27.34	14.26	9.57	
Turkey	7.79	53.98	28.08	19.95	1.44	25.16	12.41	8.34	

***, ** and * indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

As it can be seen in Table 5, the null hypothesis that there is no causality from GDP to DCP is rejected only for India at a 10 percent significance level. Alternatively, the null hypothesis stating that there is no causality from DCP to GDP is rejected for Argentina at 1 percent, for South Africa and Thailand at 5 percent, for Chile, Russia at 10 percent significance levels. Alternatively, the null hypothesis that there is no causality from DCP to GDP is rejected for Argentina at 1 percent, for South Africa and Thailand at 5 percent and for Chile and Russia at 10 percent significance levels. Therefore, it can be said that there is unidirectional causality from GDP to DCP for India and from DCP to GDP for Argentina, Chile, Russia, South Africa and Thailand. However, no causality was determined for the economies of Brazil, China, Colombia, Indonesia, Malaysia, Mexico and Turkey.

The results of the causality test between GDP and GDS for emerging markets are summarized in Table 4.

Table 4. *The Results of Panel Causality Test for GDP and GDS in Emerging Market*

Countries	H ₀ : GDP does not cause GDS					H ₀ : GDS does not cause GDP			
	Wald stat.	Bootstrap Critical Values				Wald stat.	Bootstrap Critical Values		
		1 %	5 %	10 %			1 %	5 %	10 %
Argentina	19.01*	52.80	25.26	16.45		4.23	43.16	21.82	14.70
Brazil	0.38	48.83	25.84	17.19		0.84	29.01	15.14	10.07
Chile	7.32	54.22	27.84	18.54		1.21	45.47	24.06	15.52
China	1.72	69.40	34.92	22.59		2.75	84.71	45.29	30.71
Colombia	21.01*	49.09	25.27	17.28		1.54	44.18	20.86	13.97
Indian	0.89	52.70	25.82	17.02		25.70**	45.47	23.30	16.02
Indonesia	0.14	157.5	55.24	31.81		0.91	18.68	10.65	6.96
Malaysia	0.54	70.66	36.22	24.51		0.23	37.72	18.47	12.24
Mexico	27.77*	64.60	30.86	20.94		2.63	30.47	15.70	10.41
Russia	1.05	38.63	19.84	13.4		7.74	28.14	15.31	10.55
South Africa	10.14*	28.48	14.99	9.88		0.25	23.35	12.44	8.55
Thailand	1.14	24.98	13.11	8.86		7.17	28.18	15.57	10.56
Turkey	12.06*	26.55	13.44	9.02		13.3**	22.15	12.05	8.14

***, ** and * indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

The null hypothesis that there is no causality from GDP to GDS is rejected for Argentina, Colombia, Mexico, South Africa and Turkey at 10 percent significance levels. Alternatively, the null hypothesis stating that there is no causality from GDS to GDP is rejected for India and Turkey at 5 percent significance levels. A general evaluation of the results shows that there is bidirectional causality between GDP and GDS only for the Turkish economy. At the same time, there is a unidirectional causality relationship from GDP to GDS for Argentina, Colombia, Mexico and South Africa and from GDS to GDP for India. However, no causality relationship was determined between the variables for the economies of Brazil, Chile, China, Indonesia, Malaysia, Russia and Thailand.

The results of the causality test between TR and GDP, which were used as proxy for the financial sector, are summarized in Table 5.

Table 5. *The Results of Panel Causality Test for GDP and TR in Emerging Market*

Countries	H ₀ : GDP does not cause TR					H ₀ : TR does not cause GDP			
	Wald stat.	Bootstrap Critical Values				Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%			1 %	5%	10%
Argentina	5.99	63.63	30.89	20.42		22.10*	63.80	31.35	20.65
Brazil	3.35	45.61	22.96	15.50		3.43	76.15	35.52	23.45
Chile	3.50	57.37	30.60	20.80		0.30	52.30	27.66	18.81
China	1.77	84.06	47.29	34.15		23.46*	68.60	33.79	22.74
Colombia	5.88	18.46	9.72	6.57		0.40	83.80	41.12	27.43
Indian	18.91	101.3	56.12	41.35		28.73**	54.31	27.01	17.65
Indonesia	0.16	20.61	10.12	7.25		2.40	127.57	50.41	30.40
Malaysia	1.82	34.67	18.64	12.71		2.98	60.13	32.59	22.26
Mexico	1.83	58.60	29.18	19.05		6.30	57.86	29.59	20.01
Russia	4.31	19.32	11.08	7.68		0.12	41.26	20.31	13.32
South Africa	3.01	31.07	16.47	11.25		0.36	32.32	16.54	11.49
Thailand	5.01	39.48	21.59	15.23		1.67	21.95	11.38	7.66
Turkey	5.41	23.65	13.25	9.28		10.51*	24.40	12.58	8.42

***, ** and * indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

Table 5 shows that the null hypothesis that there is no causality from TR to GDP is rejected for India and Uruguay at 5 percent and for Argentina, China and Turkey at 10 percent significance levels. According to these results, it can be said that there is unidirectional causality from TR to GDP for Argentina, China, India, Turkey and Uruguay. However, no causality was determined for some emerging countries⁽⁵⁾.

Finally, the results of the causality test between IR and GDP for emerging countries are presented in Table 6.

Table 6. *The Results of Panel Causality Test for GDP and IR in Emerging Market*

Countries	H ₀ : GDP does not cause IR					H ₀ : IR does not cause GDP			
	Wald stat.	Bootstrap Critical Values				Wald stat.	Bootstrap Critical Values		
		1 %	5%	10%			1 %	5%	10%
Argentina	0.94	30.87	15.48	10.22		0.110	73.03	35.30	22.83
Brazil	5.53	44.28	20.97	13.77		1.653	76.78	34.38	22.58
Chile	3.674	39.14	19.18	13.05		26.26*	77.47	35.48	23.21
China	1.382	45.88	22.86	15.59		0.223	64.65	30.38	19.70
Colombia	8.23	49.87	25.46	17.63		27.10*	70.41	38.41	26.41
Indian	0.25	27.98	14.49	9.72		0.533	64.39	29.97	19.14
Indonesia	3.07	37.82	19.32	12.84		88.22***	83.15	39.57	24.39
Malaysia	8.68	42.74	22.18	14.87		15.11	83.12	39.60	26.31
Mexico	2.56	37.84	19.72	13.61		0.154	28.208	13.84	9.442
Russia	0.34	37.00	19.79	13.69		8.78	38.48	18.96	12.57
South Africa	0.53	29.57	16.45	11.10		7.89	26.05	13.15	9.01
Thailand	1.39	33.94	18.11	12.50		2.22	29.69	14.75	9.74
Turkey	20.97*	43.46	23.29	16.27		6.98	26.70	13.31	8.86

***, ** and * indicate rejection of the null hypothesis at the 1, 5 and 10 percent levels of significance, respectively.

As it can be seen in Table 6, the null hypothesis that there is no causality from GDP to IR is rejected for Turkey at a 10 percent significance level, whereas it is accepted for the other twelve countries. Alternatively, the null hypothesis that there is no causality from IR to GDP is rejected for Indonesia at 1 percent, for Chile and Colombia at 10 percent significance levels. Therefore, it can be said that there is unidirectional causality for emerging countries when the analysis is based on the variable of interest rate, which is taken as proxy for financial development. It was found that the direction of this causality was from GDP to IR in Turkey and from IR to GDP in Chile, Colombia and Indonesia. However, no causality was determined in the majority of the emerging countries⁽⁶⁾.

Table 7. Summary for the direction of causality

	DCB	DCP	GDS	TR		IR		DCB	DCP	GDS	TR		IR
Emerging Mr.	Panel A: from FD to economic growth						Emerging Mr.	Panel B: from economic growth to FD					
Argentina	no	→	no	→		no	Argentina	no	no	→	no		no
Brazil	no	no	no	no		no	Brazil	no	no	no	no		no
Chile	→	→	no	no		no	Chile	→	no	no	no		no
China	no	no	no	→		no	China	no	no	no	no		no
Colombia	no	no	no	no		no	Colombia	→	no	→	no		no
Indian	no	no	→	→		no	Indian	→	→	no	no		no
Indonesia	→	no	no	no		no	Indonesia	→	no	no	no		no
Malaysia	no	no	no	no		no	Malaysia	no	no	no	no		no
Mexico	no	no	no	no		no	Mexico	no	no	→	no		no
Russia	no	→	no	no		no	Russia	no	no	no	no		no
South Africa	→	→	no	no		no	South Africa	no	no	→	no		no
Thailand	→	→	no	no		no	Thailand	no	no	no	no		no
Turkey	→	no	→	→		→	Turkey	→	no	→	no		→

Findings that support the neutrality hypothesis were obtained for emerging countries. Bidirectional causality between financial development and economic growth was determined only for Turkey. It was found that there was no causality, or a very weak causality, relationship between financial development and economic growth in the other twelve emerging countries. No causality could be determined for the variables representing financial development, especially in Brazil and Malaysia.

In this study, no causality was determined between financial development and economic growth in certain emerging countries, particularly in Argentina, Brazil, China, Russia and Mexico, which have high income levels. This can be attributed to the fact that the financial markets of the aforementioned countries experienced a late integration into the liberalization process. Socialist systems prevailed in Russia and China until the beginning of the 1990s, and the market mechanism was not completely developed. The financial markets of these two countries began to develop starting from the beginning of the 2000s. China and Russia fell behind the G7 and EU countries in terms of both trading volume and the diversity of financial instruments until the 2000s. Besides, in a socialist system, production is totally in the charge of the state. In addition to the planning of the production process by the state, the absence of private ownership and the control of trade and interest rates by the state disavow the connection between the financial sector and the

real sector. For these reasons, no causality was found between financial development and economic growth in the aforementioned countries.

Although there was not a socialist system in Latin American countries, such as Argentina, Brazil and Mexico in the period of 1990–2011, the public sector was dominant in the economy. Furthermore, continuous political instability and economic crises experienced in these countries (1994 in Mexico and 2001 in Argentina), this period deeply affected the economies of Latin American countries. For this reason, the necessary reforms could not be made and consequently the financial sector did not develop in Latin American countries until the 2000s. Starting from the beginning of the 2000s, the financial sector began to develop together with the new reforms, the acceleration of the privatization process and the liberalization process of the markets. However, such activities started late. Consequently, the coordination between the financial sector and the real sector was maintained at a considerably later stage. This weakened the connection between financial development and economic growth and thus no causality was found in the study.

4. Conclusion

In this study, whether there was a causality relationship between the financial sector and the real sector in emerging countries was analysed. The panel bootstrap causality test, which was developed by Konya (2006) and involves cross-section dependence and heterogeneity, was used in the analyses. The results of this test showed that weak causality was found between economic growth and financial development in emerging countries, except for Turkey. This shows that the neutrality hypothesis is valid for emerging markets. That is, neither the supply-leading nor the demand-following hypotheses are valid for emerging markets.

The financial sector in emerging markets does not have a developed structure compared to G7 and EU countries. In emerging countries, such as China, Russia, Brazil, Argentina and Mexico, the financial sector began to develop starting from the 2000s. When the researchers divided the studied period into two, before and after 2000, different findings can be obtained regarding the aforementioned countries. For this reason, separate evaluation of the periods before and after 2000 in analyzing the relationship between financial development and economic growth for these five countries may provide an opportunity for obtaining different results compared to previous studies.

The economies of emerging countries⁽⁷⁾ are not as developed as the economies of G7 and EU countries. It is primarily necessary for these countries to develop their financial markets. For this purpose, emerging countries may look at Turkey as a model. Turkey entered a new period after 2000. Following the two economic crises experienced in 2000 and 2001, Central Bank of Turkey (CBT) became an autonomous institution. The fixed exchange rate system was replaced by the flexible exchange rate system. The Banking Regulation and Supervision Agency (BRSA) were founded and the financial sector was taken under control. In addition to all these positive developments, successful privatization practices accelerated the liberalization of the markets and contributed to the development of the financial sector. Together with the development of the financial

sector, coordination with the real sector also increased. Thus, an annual average economic growth rate of 5 percent was achieved in the period of 2001–2012 in Turkey and accordingly the financial sector also made significant progress. Besides the banking sector, important developments were also experienced in the stock exchange market. This shows that a high coordination has been achieved between financial development and economic growth in Turkey after the year 2000.

In addition to these developments, political stability also has great importance in the development of financial markets in Turkey. Foreign capital targets those countries where there is stability and does not prefer countries experiencing uncertainty, because such countries are considered to be risky for investments. Foreign capital has a large share in the financial markets of countries, such as Turkey, which has both economic and political stability. This has positively contributed to the development of the financial markets in Turkey. It can be said that emerging countries should take Turkey as a model because of the aforementioned and similar positive developments.

Notes

- (1) This variable is from Sinha and Macri (2001), Kar et al. (2011) and Hsueh et al. (2013).
- (2) This variable is from Khan and Senhadji (2003), Liang and Teng (2006), Kar et al. (2011), Hsueh et al. (2013), Narayan and Narayan (2013).
- (3) This variable is from Khan and Senhadji (2000), Adjasi and Biekpe (2006), Enisan and Olufisayo (2009).
- (4) The estimations were performed by the SUR model of TSP 5. We are grateful to László Kónya for sharing his TSP codes.
- (5) Brazil, Chile, Colombia, Indonesia, Malaysia, Mexico, Russia, South Africa and Thailand.
- (6) Argentina, Brazil, China, India, Malaysia, Mexico, Russia, S. Africa and Thailand.
- (7) Except for Turkey, China, Russia, Brazil, Argentina and Mexico.

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Appendix 1

Table 1.1. Cross-section Dependence and Homogeneity tests

Test	Statistic	p-value
LM	608.84	0.000
CD _{LM}	42.501	0.000
CD	20.868	0.000
LM _{adj}	136.589	0.000
Delta	8.332	0.000
Tilde	9.933	0.000

Liquidity ratios. A structural and dynamic analysis, during 2006-2012, of the companies having the business line in industry and construction, listed and traded on the Bucharest Stock Exchange

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Abstract. *Liquidity ratios are used to measure a company's ability to pay short-term debt, assessing the amount of cash and cash equivalents that it has on the short term. Considering the companies listed on Bucharest Stock Exchange among the best performing, due to the high requirements imposed by a stock market, in this paper has been analyzed the way the financial crisis affected the liquidity of companies listed on BSE, acting in industry and construction domains.*

Keywords: Current liquidity ratio, Quick Ratio, Cash Ratio, listed companies.

JEL Classification: G00, G01, G30.

1. Introduction

Liquidity ratios, comparing the company's most liquid assets to the potential chargeability potential, offers a quick way to assess the degree to which the economic entity meets short-term obligations.

It is well known that stock exchanges react most severely to economic changes and the recent financial crisis has had a strong impact on the capital market.

Financial instruments and issuers must meet specific requirements for admission to trading on a regulated market, many of which being subsequent to financial performance criteria. Admission of securities to the capital market and then promotion to a higher category can only be achieved having an excellent financial performance behind that would lead to achieving the required levels of capitalization, continuous profitability for the imposed periods and ensuring future growth potential.

But admission to Bucharest Stock Exchange is not permanent; the company must maintain and constantly improve their performance. Criteria for maintaining capital market require the same performance orientation as the access ones.

Extremely vast specialized literature, national (Stancu, 2007), (Balteş 2010), (Isfănescu, 1999), (Bistriceanu, 2001) and international (Brigham, 2003), (Correia, 2001), (Dyson, 2010), (Halpern, 1994), and the economic practice uses the following ratios (Petcu, 2009), (Petrescu, 2008):

a) Current ratio reflects the coverage of current liabilities from current assets. A very common rule of thumb suggests that a current ratio of 2:1 is about right for most businesses, allowing a shrinkage of up to 50% of current assets, while still covering cover all current liabilities. (Helfert, 2001)

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current debts}} .$$

If the indicator is below 1 or if current liabilities are higher than current assets, the situation can be regarded as a sign of alarm, indicating inventory levels that have become excessive when compared to current needs, utilization of current borrowing power, or future difficulties in operating activities and possible problems in paying debts. Although low levels of the indicator do not necessarily indicate a critical situation, it should still be a major concern for management. In general, the higher the indicator values are, the higher the company's margin of safety is; however, a high value may be the cause of the company's difficulties regarding the collection of customers, or a very low stock rotation speed (Petrescu, 2008), (Vâlceanu, 2005).

b) Quick ratio expresses the company's ability to meet its short-term debts by capitalizing liabilities, short-term investments and cash. The indicator is considered normal if it is between 0.8-1.

$$\text{Quick} = \frac{\text{Current assets} - \text{Stocks}}{\text{Current debts}} .$$

c) **Cash ratio** also called the payment capacity, reflects the company's ability to pay current liabilities from the cash it has. The minimum accepted value of this indicator should be 0.2-0.3, (Petrescu, 2008), to reflect a liquidity guarantee for the company.

$$\text{Cash ratio} = \frac{\text{Cash}}{\text{current debts}}.$$

According to other authors, the numerator includes financial investments, besides cash and cash. There are, also, different views regarding the minimum accepted value, some experts establishing the level of 0.35 for it (Eros-Stark and Pantea, 2001), considering a level over 0.65 as inefficient use of current assets.

2. Research methodology

Considering, on the one hand, performance standards that companies listed on a regulated market must face, and on the other hand, the constraints and difficulties specific to the financial crisis, this paper uses the quantitative empirical analysis of companies which, according to NACE revision 2, have the business line in industry and construction, and have been listed and traded on the Bucharest Stock Exchange, BSE section, categories I; II; III during 2006-2012. Industry includes mining and quarrying, manufacturing, electricity, gas, steam and air-conditioning supply (sections: B, C, D and E, according to NACE revision 2).

The evolutions of liquidity ratios for each NACE entity and structure are analyzed during this period, highlighting the influences of the period of crisis and post-crisis on liquidity.

In December 2013, 51 companies in mining, manufacturing, production and supply of electricity, gas, steam and air-conditioning and constructions were listed and traded on the Bucharest Stock Exchange.

Starting with the financial year 2012, companies whose securities are admitted to trading on a regulated market, are required to apply IFRS individual annual financial statements, in accordance with the Order of the Minister of Public Finance no.1286/2012. In applying these regulations, companies have restated financial statements of 2011, according to legal norms, which led to differences between the financial statements for 2011, the initial version and restated. The corresponding financial indicators for 2011 are extracted from the accounting reporting for the year 2012, according to International Financial Reporting Standards, approved by the Ministry of Public Finance, and presented in the following as 2011r. Whereas analysis of the influence of the 2011 restatement of financial statements on financial indicators is the subject of another work, were presented both liquidity indicators calculation alternatives, and only a brief analysis of the occurring differences.

Liquidity analysis was based on financial statements published on Bucharest Stock Exchange website, and available on each listed company website. All results and graphs are the authors' own calculations and representations, performed on the specified data.

This analysis is only one part of a larger work, the doctoral thesis concerning the financial performance of listed companies.

3. Data analysis

For the mentioned companies, the Current Ratio, Quick Ratio and Cash Ratio were calculated, the average values for each company being presented in Table 1.

Table 1. *Evolution of average liquidity ratios, during 2006-2012*

Company	Department	The average current ratio - average level per company -	The average quick ratio - average level per company -	The average cash ratio - average level per company -
OMV PETROM S.A.	06 Extraction of crude petroleum and natural gas	6.63	5.41	3.26
ROMGAZ		1.53	1.01	0.35
DAFORA SA	09 Mining support service activities	1.21	0.88	0.12
ROMPETROL WELL SERVICES S.A.		6.99	6.44	1.54
BOROMIR PROD SA BUZAU (SPICUL)	10 Food industry	1.73	1.25	0.14
BERMAS S.A.	11 Manufacture of beverages	2.23	0.47	0.11
SIRETUL PASCANI S.A.	13 Manufacture of textiles	2.34	1.64	0.10
CONTEC SA DOROHOI	14 Manufacture of clothes	4.81	3.72	2.14
VRANCART SA	17 Manufacture of paper and paper products	1.15	0.76	0.02
ROMPETROL RAFINARE S.A.	19 Manufacture of coke products and products obtained from refined petroleum	0.65	0.45	0.02
SINTEZA S.A.	20 Manufacture of chemicals and chemical products	3.90	2.03	0.69
ANTIBIOTICE S.A.	21 Manufacture of basic pharmaceutical products and pharmaceutical preparations	2.00	1.69	0.18
BIOFARM S.A.		4.73	4.05	2.52
ZENTIVA S.A.		4.49	3.97	1.31
ARTEGO SA Tg. Jiu	22 Manufacture of rubber and plastic products	1.33	0.57	0.06
TERAPLAST SA		1.22	0.80	0.08
ROMCARBON SA BUZAU		0.68	0.47	0.21
MJ MAILLIS ROMANIA S.A.		0.46	0.26	0.02
PRODPLAST S.A.		15.31	13.32	10.14
STIROM SA Bucuresti	23 Manufacture of other non-metallic mineral products	1.22	0.81	0.17
CEMACON SA CLUJ-NAPOCA		0.73	0.51	0.40
PREFAB SA BUCURESTI		1.66	1.30	0.19
COMCM SA CONSTANTA		3.03	2.42	0.33
CARBOCHIM S.A.		1.85	0.80	0.07
TMK - ARTROM S.A.	24 Metallurgical Industry	2.03	1.04	0.07
ALRO S.A.		2.55	1.45	0.65

Company	Department	The average current ratio - average level per company -	The average quick ratio - average level per company -	The average cash ratio - average level per company -
VES SA	25 Metallic construction and metal products industry, exclusively machinery and equipment	1.13	0.66	0.05
ELECTROMAGNETICA SA BUCURESTI	26 Manufacture of computer, electronic and optical products	1.84	1.48	0.51
CONTOR GROUP S.A. Arad		0.83	0.40	0.02
ELECTROPUTERE S.A.	27 Manufacture of electrical equipment	0.62	0.48	0.08
RETRASIB SA SIBIU		1.27	0.79	0.16
ELECTROAPARATAJ S.A.		3.38	1.66	0.39
GRUPUL INDUSTRIAL ELECTROCONTACT S.A.		2.90	1.69	0.24
ELECTROARGES SA CURTEA DE ARGES		1.38	0.59	0.19
MECANICA CEAHLAU	28 Manufacture of machinery and n.e.c. equipment	2.40	1.58	0.72
COMELF S.A.		1.06	0.61	0.09
UZTEL S.A.		4.02	2.15	0.55
ALTUR S.A.	29 Manufacture of motor vehicles, trailers and semi-trailers	1.36	0.95	0.26
COMPA S. A.		1.53	1.00	0.03
MEFIN S.A.		6.00	2.89	1.19
UAMT S.A.		1.10	0.53	0.03
SANTIERUL NAVAL ORSOVA S.A.	30 Manufacture of other means of transportation	3.88	1.49	0.85
VOESTALPINE VAE APCAROM SA		2.95	1.92	1.10
TURBOMECANICA S.A.		1.20	0.34	0.04
AEROSTAR S.A.		3.59	2.84	1.52
S.N. NUCLEARELECTRICA S.A.	35 Production and supply of electricity, gas, steam and air conditioning	3.37	2.04	1.46
AMONIL S.A.		1.60	0.98	0.19
C.N.T.E.E. TRANSELECTRICA		1.22	1.18	0.27
IMPACT DEVELOPER & CONTRACTOR S.A.	41 Construction of buildings	5.11	1.56	0.47
SC TRANSILVANIA CONSTRUCTII SA		1.45	0.88	0.42
CONDMAG S.A.	42 Civil engineering	1.63	1.32	0.34

Source: author's own calculations.

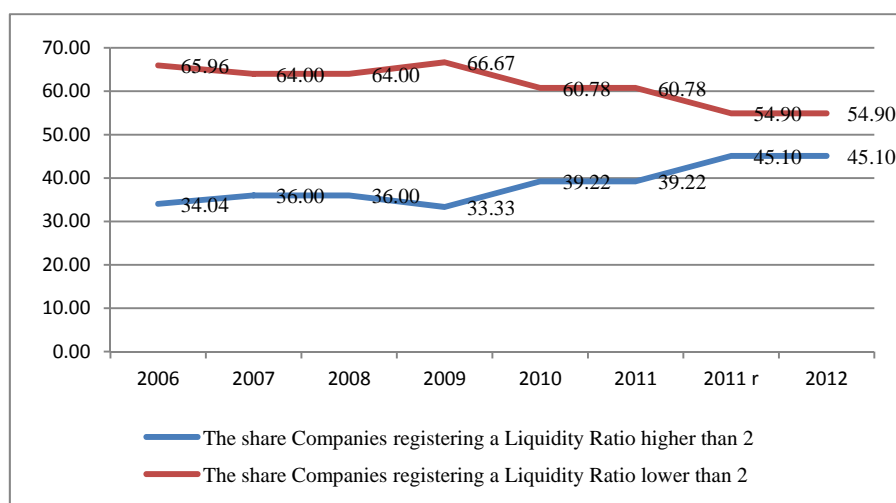
Considering the recommended value for Current ratio, of 2, the companies were grouped according to this indicator's value, the results being presented in Table 2.

Table 2. Companies listed on the BSE situation, depending on the value of 2, registered by the Current Ratio

Specification	2006		2007		2008		2009		2010		2011		2011 r		2012	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Companies registering a Liquidity Ratio lower than 2	31	65.9	32	64.0	32	64.0	34	66.6	31	60.7	31	60.7	28	54.9	28	54.9
Companies registering a Liquidity Ratio higher than 2	16	34.0	18	36.0	18	36.0	17	33.3	20	39.2	20	39.2	23	45.1	23	45.1
Total	47	100	50	100	50	100	51	100	51	100	51	100	51	100	51	100

Source: author's own calculations.

Analyzing the results obtained, can be noted an increase of 43.75% in 2012 compared to 2006, the number of companies that have experienced a rate of current liquidity higher than the recommended value of 2, as it can also be observed in Figure 1. Annually, there was an average rate of increase of 4.8% in the share of companies that have experienced a liquidity ratio higher than 2.

Figure 1. The evolution of the share of companies that have experienced a rate of current liquidity higher and lower than the value of 2

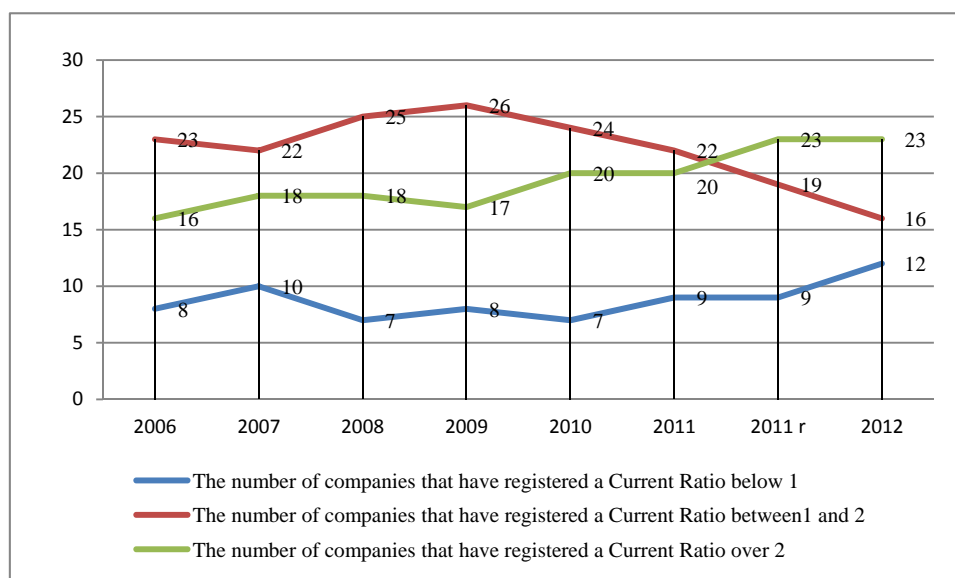
Source: author's own calculations

Considering the existence of a safety margin for the company in case of current liquidity of over 1, the analysis of current liquidity ratio was refined, according to these thresholds: less than 1, between 1 and 2 over 2, classifying the 51 companies in terms of these parameters, situations presented in the Table 3 and Figures 2 and 3:

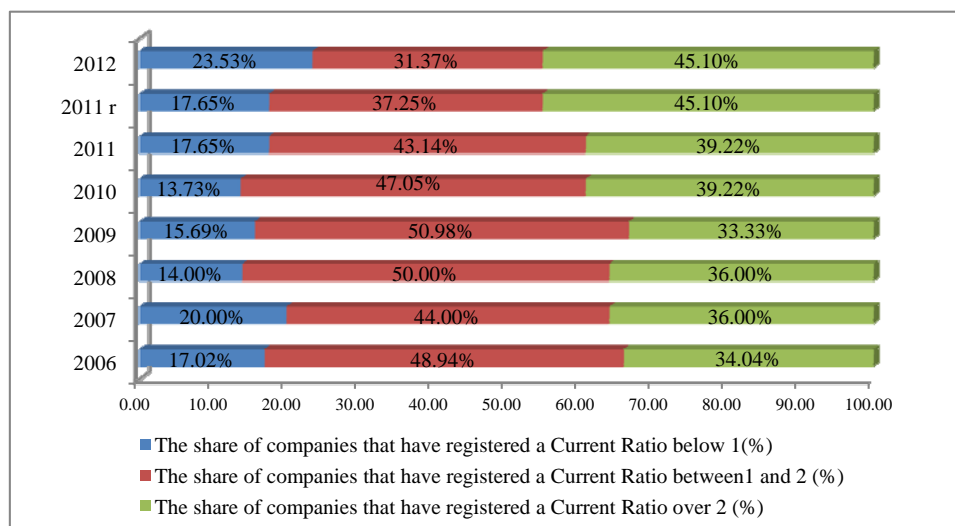
Table 3. Companies listed on the BSE situation, depending on the level of current ratio

Specification	2006	2007	2008	2009	2010	2011	2011 r	2012
The number of companies that have registered a Current Ratio below 1	8	10	7	8	7	9	9	12
The number of companies that have registered a Current Ratio between 1 and 2	23	22	25	26	24	22	19	16
The number of companies that have registered a Current Ratio over 2	16	18	18	17	20	20	23	23
TOTAL COMPANIES	47	50	50	51	51	51	51	51
The share of companies that have registered a Current Ratio below 1 (%)	17.02%	20.00%	14.00%	15.69%	13.73%	17.65%	17.65%	23.53%
The share of companies that have registered a Current Ratio between 1 and 2 (%)	48.94%	44.00%	50.00%	50.98%	47.06%	43.14%	37.25%	31.37%
The share of companies that have registered a Current Ratio over 2 (%)	34.04%	36.00%	36.00%	33.33%	39.22%	39.22%	45.10%	45.10%

Source: author's own calculations.

Figure 2. The evolution of the number of companies, depending on the level of current ratio

Source: author's own calculations.

Figure 3. *The evolution of the share of companies depending on the level of current ratio*

Source: author's own calculations.

Analyzing the data presented, it is noted that the share of companies that have a current liquidity lower than 1 is the lowest, not exceeding 25%. A reverse relationship exists between the percentage of companies with current liquidity between 1 and 2, and those with current liquidity over 2: although the percentage of companies that have current liquidity between 1 and 2 decreased, the share of those which have current liquidity over 2 increased.

Beyond the numbers, this is not entirely due to an increase in liquidity, but rather the accumulation of receivables and inventories, due to economic difficulties during the crisis.

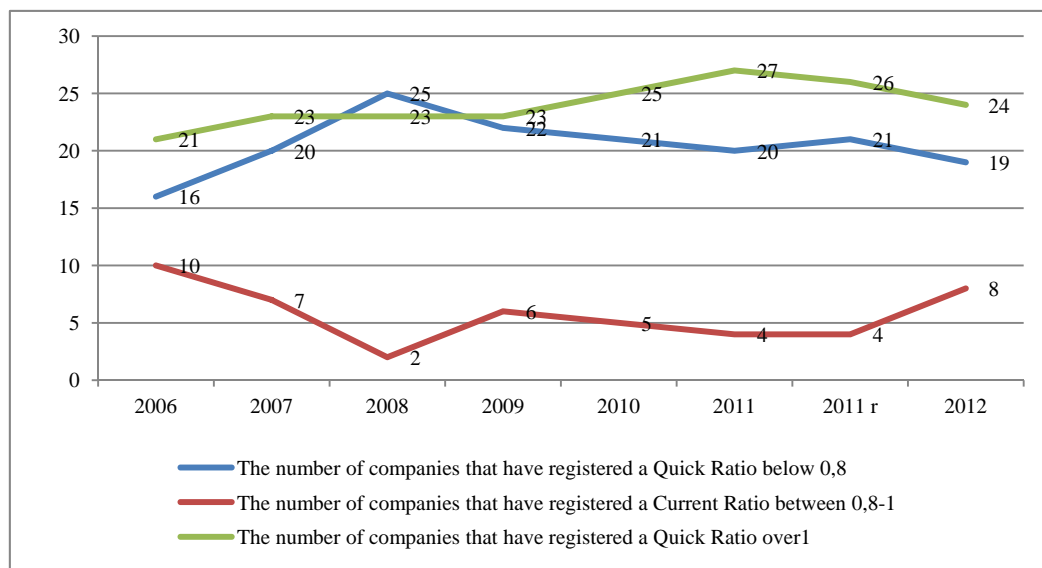
Considering the recommended values for Quick Liquidity Ratio, between 0.8 and 1, the companies have been grouped according to this indicator's value in three groups: below 0.8, 0.8-1, over 1, the situation being presented Table 4.

Table 4. *Companies listed on the BSE, depending on the level of Quick Ratio*

Specification	2006	2007	2008	2009	2010	2011	2011 r	2012
The number of companies that have registered a Quick Ratio below 0.8	16	20	25	22	21	20	21	19
The number of companies that have registered a Current Ratio between 0.8-1	10	7	2	6	5	4	4	8
The number of companies that have registered a Quick Ratio over 1	21	23	23	23	25	27	26	24
Total companies	47	50	50	51	51	51	51	51
The share of companies that have registered a Quick Ratio below 0.8 (%)	34.04%	40.00%	50.00%	43.14%	41.18%	39.22%	41.18%	37.25%
The share of companies that have registered a Quick Ratio between 0.8-1 (%)	21.28%	14.00%	4.00%	11.76%	9.80%	7.84%	7.84%	15.69%
The share of companies that have registered a Quick Ratio over 1 (%)	44.68%	46.00%	46.00%	45.10%	49.02%	52.94%	50.98%	47.06%

Source: author's own calculations.

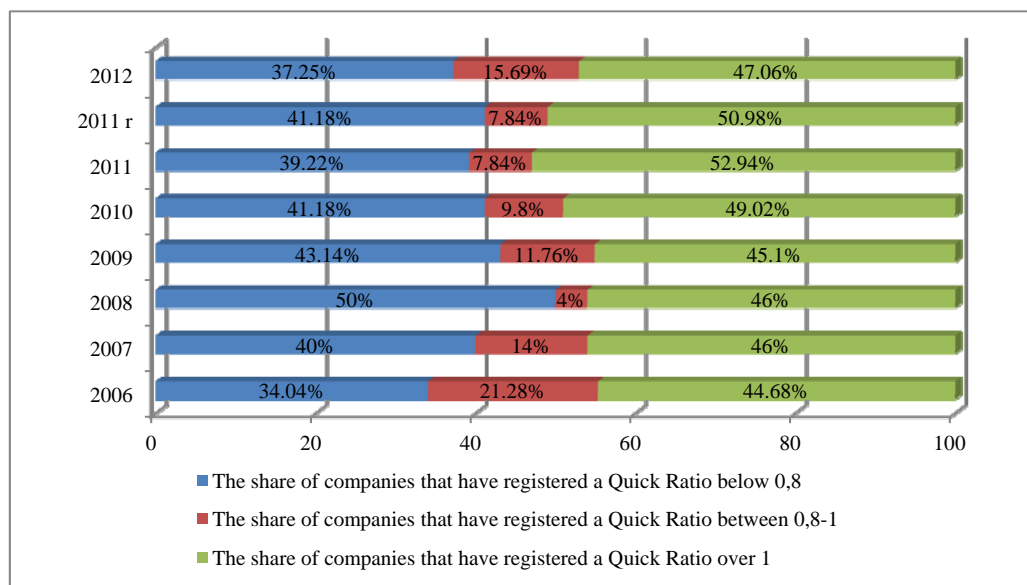
Figure 4. *The evolution of the number of companies have registered a Quick Ratio between 0.8-1, above 1 or below 0.8, and it's dynamic during 2006-2012*



Source: author's own calculations.

Analyzing the quick liquidity ratio (Figure 4), can be noted that only in 2008 the number of companies that have experienced a quick liquidity ratio lower than the recommended threshold, of 0.8, was higher than that of the companies that have had a quick liquidity of under 0.8. Moreover, the percentage of companies whose quick ratio was below the recommended threshold was significant, of 50 %, half of the companies listed on the BSE having issues regarding the ability to cope with current liabilities. Referring to the share of companies in the total companies, appreciated depending on the values of quick liquidity, it may revealed that the share of companies that have registered a Quick Ratio of over 1 is not significantly different from the percentage of companies that have registered a Quick liquidity ratio below 0.8, while the percentage of companies that have registered a Quick ratio between 0.8-1 has the lowest values, down from 21% in 2006 to 4% in 2008, followed by a recovery to the level of 7 -9% after 2008.

Figure 5. The share of companies that have registered a Quick Ratio between 0.8-1, above 1 or below 0.8, and the dynamics of percentages in the period 2006-2012



Source: author's own calculations.

Two types of companies can be seen, as related to the Quick Ratio: companies with too large liquidity and companies with problems in terms of liquidity.

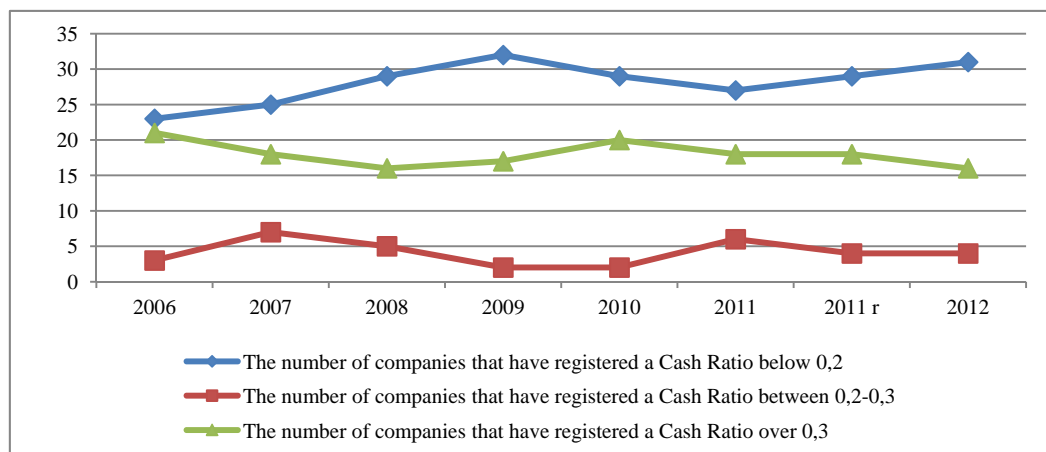
Considering the minimum recommended values for Cash Liquidity Ratio, between 0.2 and 0.3, we have grouped the companies according to this indicator's value in three groups: below 0.2, between 0.2-0.3, over 0.3, the situation being presented Table 5.

Table 5. Companies listed on the BSE, depending on the level of Cash Ratio

Specification	2006	2007	2008	2009	2010	2011	2011 r	2012
The number of companies that have registered a Cash Ratio below 0.2	23	25	29	32	29	27	29	31
The number of companies that have registered a Cash Ratio between 0.2-0.3	3	7	5	2	2	6	4	4
The number of companies that have registered a Cash Ratio over 0.3	21	18	16	17	20	18	18	16
Total companies	47	50	50	51	51	51	51	51
The share of companies that have registered a Cash Ratio below 0.2 (%)	48.94%	50.00%	58.00%	62.75%	56.86%	52.94%	56.86%	60.78%
The share of companies that have registered a Cash Ratio between 0.2-0.3 (%)	6.38%	14.00%	10.00%	3.92%	3.92%	11.76%	7.84%	7.84%
The share of companies that have registered a Cash Ratio over 0.3 (%)	44.68%	36.00%	32.00%	33.33%	39.22%	35.29%	35.29%	31.37%

Source: author's own calculations.

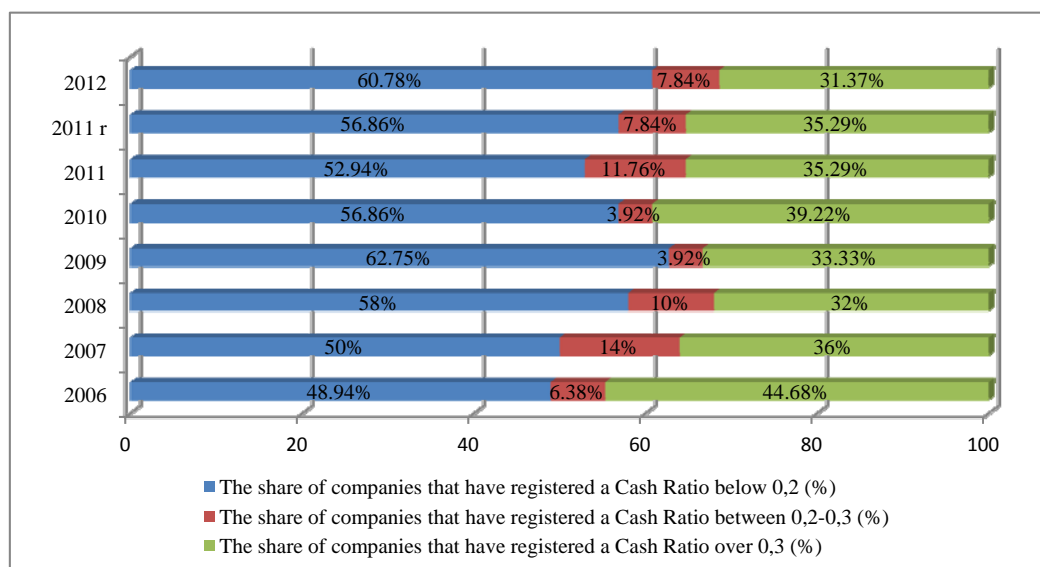
Figure 6. The evolution of the number of companies have registered a Cash Ratio between 0.2-0.3, above 0.3 or below 0.2, and it's dynamic during 2006-2012



Source: author's own calculations.

Considering the less accepted value, between 0.2-0.3, the number of companies registering values of cash ratio between 0.2-0.3 exceeds the number of companies that have experienced cash ratio values greater than 0.3, but is less than the number of companies lying in an alarming position, with cash liquidity below the recommended minimum (Figure 7).

Figure 7. The share of companies that have registered a Cash Ratio between 0.2-0.3, above 0.3 or below 0.2, and the dynamics of percentages in the period 2006-2012



Source: author's own calculations.

Dynamics of weighted by Cash Ratio rates did not change significantly (Figure 7). The Share of companies that registered values of the Cash Ratio below the recommended thresholds increased by an average annual rate of 3.68%, while the Share of companies that registered values of the Cash Ratio above 0.3 increased by an average annual rate of 3.49%. A more pronounced dynamic was registered in case of companies for which Cash Ratio was between 0.2 and 0.3, the share of these companies decreasing annually by an average of 5.72%.

Since the individual values of liquidity ratios for each company, analyzed per years are characterized by a very high variation, the coefficient of variation with high values recorded annually for each period analyzed, over 90%, indicating an arithmetic mean which is not representative, the average annual liquidity ratios have been calculated based on cumulative values of current assets, receivables, cash and cash equivalents and current liabilities of the companies listed and traded on the BSE, the results for the three liquidity ratios being presented in Table 6.

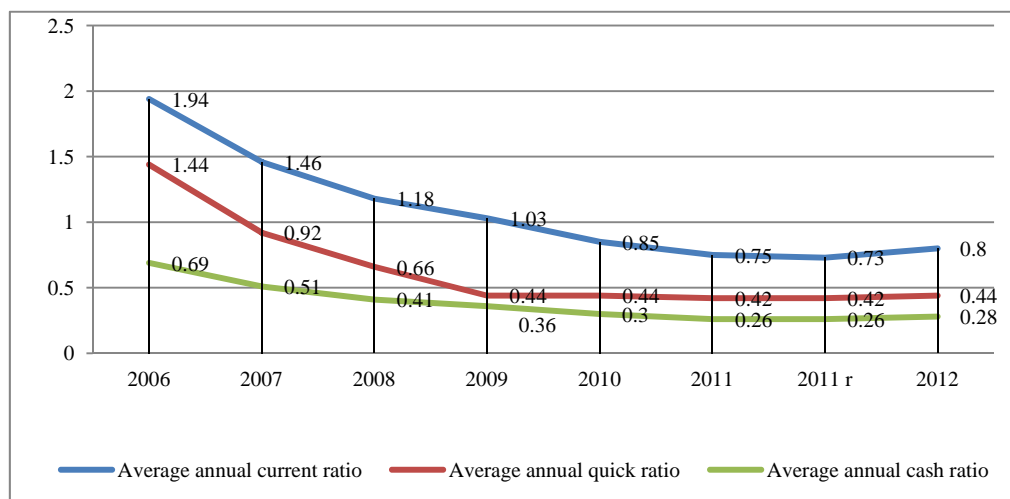
Table 6. Average annual liquidity indicators, registered by industrial companies listed on BSE

Specification	2006	2007	2008	2009	2010	2011	2011 r	2012
Average annual current ratio	1.94	1.46	1.18	1.03	0.85	0.75	0.73	0.80
Average annual quick ratio	1.44	0.92	0.66	0.44	0.44	0.42	0.42	0.44
Average annual cash ratio	0.69	0.51	0.41	0.36	0.30	0.26	0.26	0.28

Source: author's own calculations.

The evolution of average annual liquidity ratios are presented in Figure 8.

Figure 8. The evolution of average annual liquidity ratios



Source: author's own calculations.

According to the calculation methodology proposed, liquidity rates recorded an identical behavior: they decreased during 2006-2011, and showed a slight recovery in 2012, but without reaching the level recorded before the crisis; the average annual current ratio and

quick ratio is below the minimum threshold recommended for these indicators, cash ratio being within the recommended margins, and over.

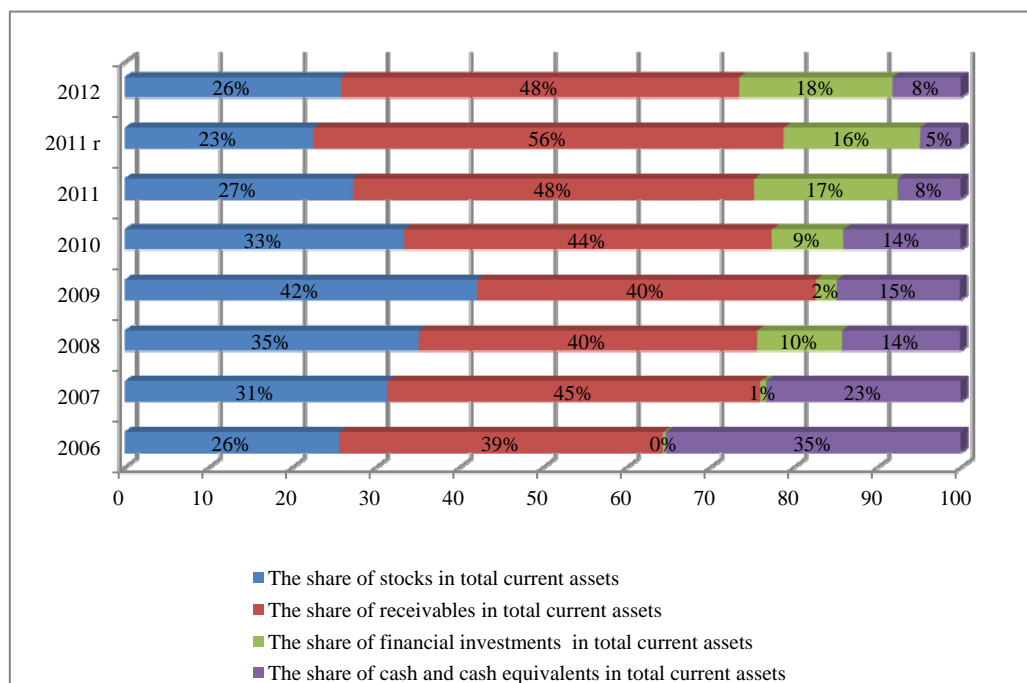
Average annual current ratio decreases from 1.94 recorded in 2006 to 0.8 value recorded in 2012, registering an average annual rate of decrease of 13.67 %. If in 2006 the value of the Average annual current ratio was very close to the recommended level of 2, in 2012 the level is much below the recommended threshold, being even below the recommended level for Quick liquidity ratio.

The average annual quick ratio registered in 2006 the level of 1.44, above the recommended threshold, decreasing during the analyzed period by an average annual rate of 18.81%, the level reached in 2012 of 0.44% being below the minimum recommended.

The average annual cash ratio throughout the period under review had values over the minimum accepted level, which indicates that, although subject to the negative effects of the financial crisis, industrial companies listed on the BSE however, have a proper management of current liabilities, successfully facing due payments. Despite these positive reviews, the average annual cash ratio also decreased by an average annual rate of 13.67%, alarmingly approaching the minimum level, starting with 2010.

These evolutions of liquidity indicators were due to changes in the structure and values of the components of total current assets and total current liabilities.

Figure 9. *The share of the components of total current assets*



Source: author's own calculations.

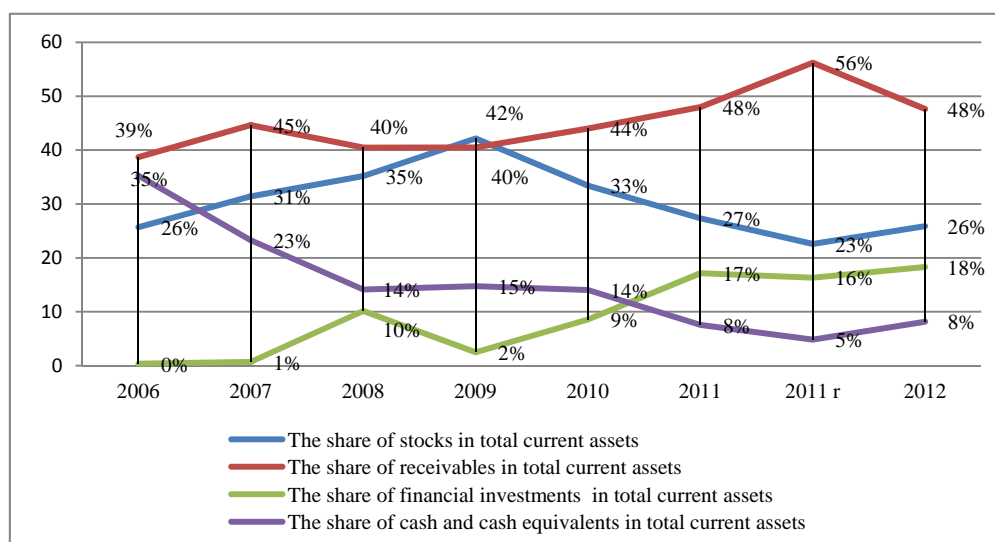
During 2006-2007, stocks, receivables and cash and cash equivalents occupied similar weights in the current assets, financial investments being almost nonexistent. Since 2008, there has been a slight increase in the share of debt and a massive increase in the share of financial investments amid the sharp fall in the share of deposits in total current assets.

The share of stocks in total current assets grew by 20% in 2009, as compared to 2008, due to commercial difficulties during the crisis, as in 2011-2012 to return to levels close to those of 2006.

Looking at the Figure 10, can be noted that, regardless of the evolution, receivables held the largest share of current assets, being exceeded by stocks only in 2009, and only by 2 percentage points: stocks held in 2009, 42% of total current assets, and claims 40% of total current assets.

The lowest percentage of current assets is held by financial investments. If in 2006 they were almost nonexistent, in 2012 they came to account for 18% of total current assets. Beginning with 2010, financial investments have had a higher share than cash and cash equivalents.

Figure 10. *Evolution of the share of current assets components*



Source: author's own calculations.

The dynamic analysis of structural changes in the elements of current assets indicates that the share of liquid assets in the total current assets records the strongest decrease, from 35% in 2006 to 8% in 2012.

The highest average annual rate of change was registered in the share of cash and cash equivalents in current assets, decreasing by an average annual rate of 21.67%. On the counter pole there was the change in current assets share of financial investments, which recorded an average annual rate of growth of 46.26%.

The most reduced dynamics was registered in the share of stocks in total current assets, which increased by an average annual rate of only 0.11%.

Individual developments of each indicator, presented based on chain indexes, are shown in the Table 7.

Table 7. Individual chain indexes for total current assets elements

Specifications	Individual indexes (Chain indexes $I_t = I_{n+1}/I_n$)								Average rate of change
	2007-2006	2008-2007	2009-2008	2010-2009	2011-2010	2011r-2010	2012-2011r	2012-2011	
TOTAL CURRENT ASSETS	117.96	106.68	107.42	107.49	109.99	127.68	108.10	108.10	9.54
TOTAL Stocks	144.23	119.46	128.72	85.15	90.03	86.36	102.29	102.29	9.66
TOTAL Receivables	136.08	96.70	107.51	116.82	119.91	163.08	107.30	107.30	13.40
TOTAL Short-term financial investments	229.35	1576.34	26.41	368.90	220.32	243.48	115.44	115.44	16.83
TOTAL Cash and cash equivalents	77.83	64.71	112.18	102.26	59.31	43.99	116.48	116.48	-36.83
TOTAL current DEBTS	133.15	124.10	114.01	120.98	114.37	117.15	92.68	92.68	15.84
Share of stocks in current assets (%)	122.27%	111.98%	119.84%	79.22%	81.86%	67.63%	94.63%	94.63%	0.11%
Share of receivables in current assets (%)	115.36%	90.65%	100.09%	108.68%	109.02%	127.72%	99.26%	99.26%	3.52%
Share of financial investments in current assets (%)	194.43%	1477.63%	24.59%	343.20%	200.31%	190.69%	106.79%	106.79%	46.26%
Share of cash and cash equivalents in current assets (%)	65.98%	60.66%	104.44%	95.13%	53.92%	34.45%	107.75%	107.75%	-21.67%

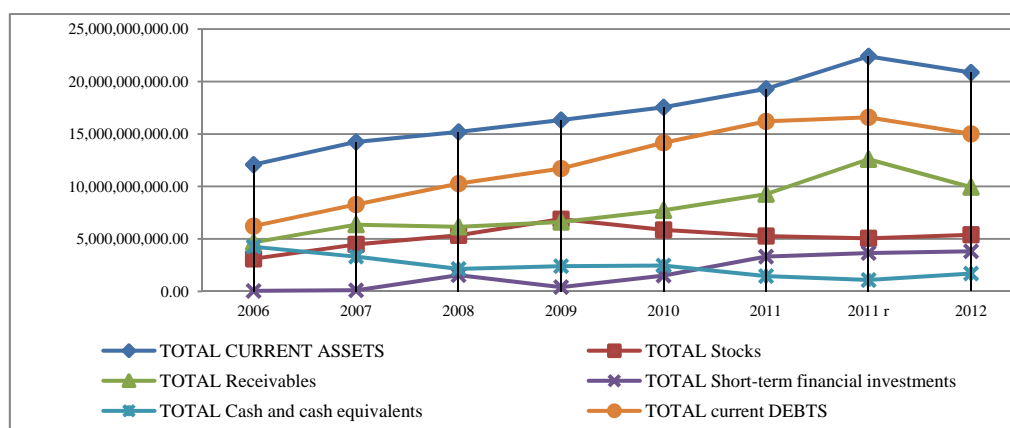
Source: author's own calculations.

Analyzing trends throughout the period 2006-2012, total current assets recorded an average annual rate of growth of 9.54%, supported by the growth of total stocks by an average annual rate of 9.66%, 13.4% of claims and total financial investments of 13.4%.

Cash and cash equivalents recorded an average annual rate of decline of 36.83%.

Although current assets increased, the stronger average annual rate of growth of debt, by 15.84%, caused the aforementioned evolutions of liquidity ratios.

Figure 11. The evolution of total current assets elements



Source: author's own calculations.

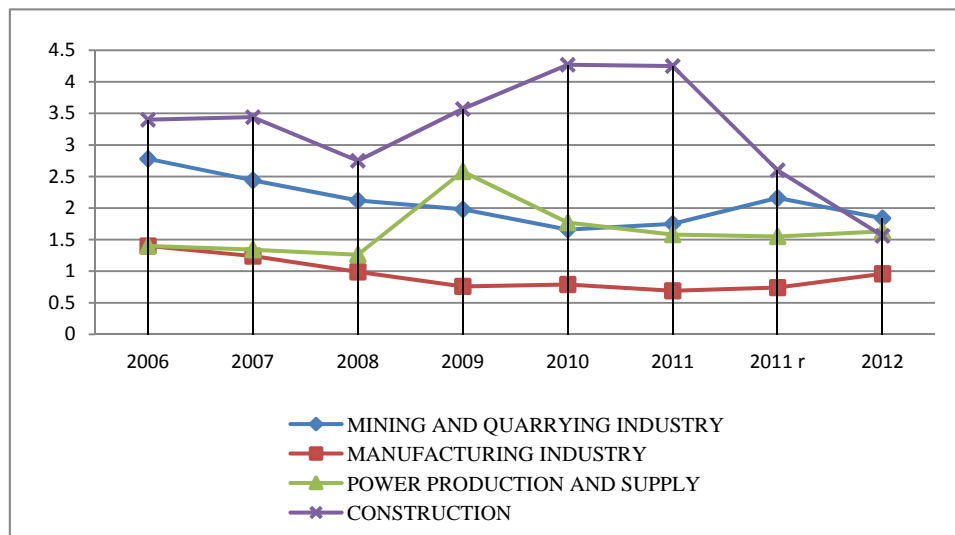
At the level of industries, a comparative analysis of average liquidity ratios, at the level of divisions, according to NACE classification Rev.2, presented in the Table 8 and Figures 12, 13 and 14, reveals:

Table 8. Average rates of liquidity, on industry divisions, according to NACE, rev. 2

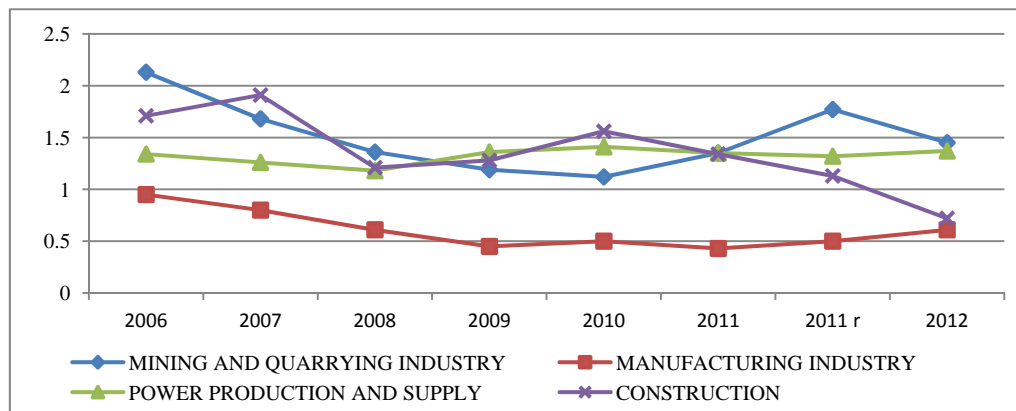
Section. According to NACE. rev.2	2006	2007	2008	2009	2010	2011	2011 r	2012
Annual average Current Ratio								
MINING AND QUARRYING INDUSTRY	2.78	2.44	2.12	1.98	1.66	1.75	2.16	1.84
MANUFACTURING INDUSTRY	1.40	1.24	0.99	0.76	0.79	0.69	0.74	0.96
POWER PRODUCTION AND SUPPLY	1.40	1.34	1.26	2.58	1.77	1.58	1.55	1.63
CONSTRUCTION	3.40	3.44	2.75	3.57	4.27	4.25	2.60	1.56
Annual average Quick Ratio								
MINING INDUSTRY	2.13	1.68	1.36	1.19	1.12	1.35	1.77	1.45
MANUFACTURING INDUSTRY	0.95	0.80	0.61	0.45	0.50	0.43	0.50	0.61
POWER PRODUCTION AND SUPPLY	1.34	1.26	1.18	1.36	1.41	1.35	1.32	1.37
CONSTRUCTION	1.71	1.91	1.21	1.28	1.56	1.34	1.13	0.72
Annual average Cash Ratio								
MINING INDUSTRY	1.53	0.82	0.73	0.36	0.45	0.55	0.53	0.55
MANUFACTURING INDUSTRY	0.11	0.12	0.10	0.10	0.10	0.05	0.06	0.13
POWER PRODUCTION AND SUPPLY	0.44	0.23	0.22	0.58	0.18	0.16	0.16	0.31
CONSTRUCTION	0.84	1.07	0.42	0.29	0.32	0.27	0.22	0.07

Source: author's own calculations.

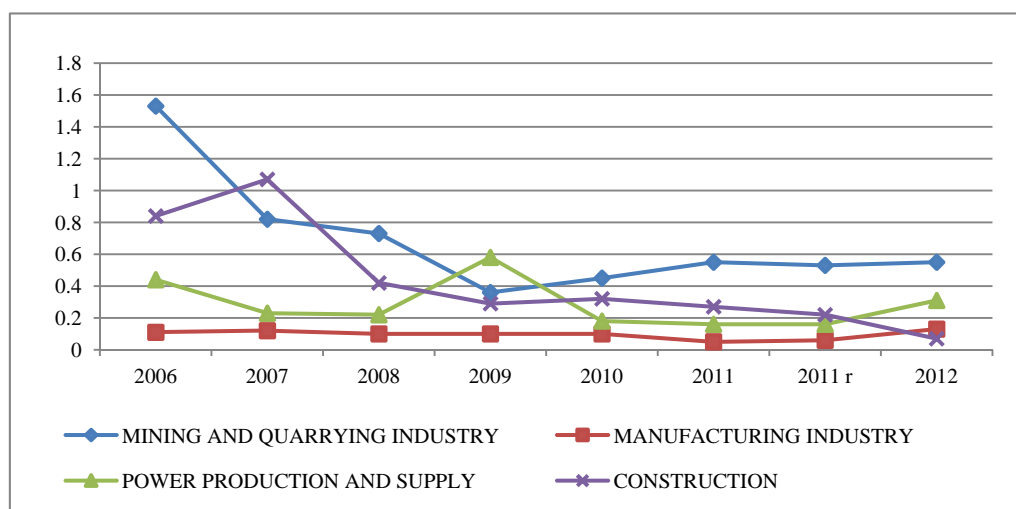
Figure 12. Average Current Ratio, on industries



Source: author's own calculations.

Figure 13. *Average Quick Ratio, on industries*

Source: author's own calculations.

Figure 14. *Average Cash Ratio, on industries*

Source: author's own calculations.

For the entire period under review, the manufacturing industry had the lowest liquidity ratios, regardless of their type, except for quick liquidity ratio, which, in 2012 was the lowest in construction.

The moment when there were recorded the lowest average annual levels of liquidity vary by industry: the manufacturing industry had the lowest levels recorded in 2011, for all ratios, while in constructions, the minimum level was reached in 2012. In mining and quarrying, the period with the lowest average annual levels of liquidity was 2009-2010, and for the production and supply of electricity, in 2008, for the annual average quick and current ratio and 2011 for the annual average cash ratio.

Not least must be outlined the occurring differences in financial indicators of liquidity, due to IFRS implementations:

- No difference: the number and the share of companies that have registered a Current Ratio below 1; the number of companies that have registered a Current Ratio between 0.8-1; average annual quick ratio; Average annual cash ratio.
- Slight Differences: the number and the share of companies that have registered a Quick Ratio below 0,8; the number of companies that have registered a Quick Ratio over 1; average annual current ratio; the share of companies that have registered a Quick Ratio over 1.
- Greater differences, of 5%-15%: the number and the share of companies that have registered a Current Ratio between 1 and 2; the number and the share of companies that have registered a Current Ratio over 2; the share of stocks in total current assets; the share of receivables in total current assets the share of financial investments in total current assets; the share of cash and cash equivalents in total current assets; individual chain indexes of each component of total current assets. Beyond the numeric values, these differences shows that harmonization of the financial reports was an imperative, for a true and fair view of each company's financial position and performance.

4. Conclusions

Considering the liquidity rates, computed for each company during 2006-2012, the following issues must be noted: The number of companies that have experienced a rate of current liquidity higher than the recommended value of 2, increases annually with an average rate of increase of 4.8%. The share of companies that have registered a Quick Ratio of over 1 is not significantly different from the percentage of companies that have registered a Quick liquidity ratio below 0.8, while the percentage of companies that have registered a Quick ratio between 0.8-1 has the lowest values, down from 21% in 2006 to 4% in 2008, followed by a recovery to the level of 7-9% after 2008. Dynamics of weighted by Cash Ratio wasn't significantly for companies that registered values of the Cash Ratio less than 0.2 or greater than 0.3. The share of these companies increased by an average annual rate of 3.49-3.68%. A more pronounced dynamic was registered in case of companies for which Cash Ratio was between 0.2 and 0.3, the share of these companies decreasing annually by an average of 5.72%.

At industry and construction level, liquidity rates recorded an identical behavior: they decreased during 2006-2011, and showed a slight recovery in 2012, but without reaching the level recorded before the crisis; the average annual current ratio and quick ratio is below the minimum threshold recommended for these indicators, cash ratio being within the minimum accepted margins, and over. Average annual current ratio decreases by an average annual rate of 13.67%, the average annual quick ratio decreases by an average annual rate of 18.81 average annual cash ratio also decreased by an average annual rate of 13.67%. This evolution is due slight increase in the share of debt and a massive increase in the share of financial investments amid the sharp fall in the share of deposits in total current assets, occurred since 2008. Regardless of the evolution, receivables held the largest share of current assets, being exceeded by stocks only in 2009, and only by 2

percentage points: stocks held in 2009, 42% of total current assets, and claims 40% of total current assets. The lowest percentage of current assets is held by financial investments. If in 2006 they were almost nonexistent, in 2012 they came to account for 18% of total current assets. Beginning with 2010, financial investments have had a higher share than cash and cash equivalents.

The dynamic analysis of structural changes in the elements of total current assets indicates that the share of total liquid assets in the total current assets records the strongest decrease, from 35% in 2006 to 8% in 2012. The highest average annual rate of change was registered in the share of total cash and cash equivalents in current assets, decreasing by an average annual rate of 21.67%. On the counter pole there was the change in current assets share of total financial investments, which recorded an average annual rate of growth of 46.26%. The most reduced dynamics was registered in the share of total stocks in total current assets, which increased by an average annual rate of only 0.11%. Although current assets increased, the stronger average annual rate of growth of debt, by 15.84%, caused the aforementioned evolutions of liquidity ratios.

At the level of industries, a comparative analysis of average liquidity ratios, at the level of divisions, according to NACE classification Rev.2 emphasizes that for the entire period under review, the manufacturing industry had the lowest liquidity ratios, regardless of their type, except for quick liquidity ratio, which, in 2012 was the lowest in construction. The moment when there were recorded the lowest average annual levels of liquidity vary by industry: the manufacturing industry had the lowest levels recorded in 2011, for all ratios, while in constructions, the minimum level was reached in 2012. In mining and quarrying, the period with the lowest average annual levels of liquidity was 2009-2010, and for the production and supply of electricity, in 2008, for the annual average quick and current ratio and 2011 for the annual average cash ratio.

The differences in financial indicators of liquidity, occurring at the level of year 2011, due to IFRS implementations, are greater than 5% for the number and share of companies that have registered a Current Ratio between 1 and 2; the number and share of companies that have registered a Current Ratio over 2; the share of stocks in total current assets; the share of receivables in total current assets; the share of financial investments in total current assets; the share of cash and cash equivalents in total current assets; individual chain indexes of each component of total current assets. This may cause future problems in comparing performance indicators.

Liquidity ratios cannot be interpreted out of economic context or without correlating them with other financial indicators. Considering that this analysis represents only a one part of a larger work on the financial performance of listed companies, and summarizing mentioned items in analyzing liquidity, it may be noted that listed companies at Bucharest Stock Exchange, acting in industry and construction, didn't face major challenges related to payment of current liabilities, at least in terms of cash ratio. Although liquidity ratios are lowering industrial companies listed on the BSE however, have a proper management of current liabilities, successfully facing due payments, coping well with the period of crisis and recession.

5. Acknowledgments

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The Romanian banking sector restructuring and the economic recovery

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Abstract. *The Romanian economy is highly dependent on the financing coming from the banking sector. The total net assets of the banking system accounted for approx. 60% of the GDP in 2013. The increasingly integrated financial markets have facilitated the foreign capital inflows and the expansion of the Romanian banking system on the one hand, but on the other hand, it determined the transfer of the negative effects of the economic crisis on the domestic banking sector. Currently, the resumption of lending to companies and households along with a more balanced distribution on currencies of the new loans represents one of the main challenges of the banking sector in Romania. This article aims to analyze some of the changes in progress and the ones that already occurred after the economic and financial crisis in the Romanian banking system, and their impact on the recovery process.*

Keywords: banking sector, regulations, economic growth, lending.

JEL Classification: G21, G28.

1. Introduction

The restructuring of a system can be generated both by internal or external factors. The internal restructuring has a proactive nature designed to improve continuously the operating model of the system concerned while, the external determined restructuring represents in general the systems' adjustment reaction to the action of external factors. The current restructuring of the banking system was caused by the economic crisis and it consists in a process of readjustment to the new market conditions. The post-crisis economy characterized by low growth rates, uncertainty and instability, the pressure for regulation, redefines the conditions under which the banking industry must act in the future (Ernst & Young, 2013).

The imbalances faced by the banking sector during the crisis have determined many banks to rely on state aid. The aid received from national governments came accompanied by a number of conditions and restrictions which eventually forced system restructuring. The contraction of the economic activity has led to a restriction of the loan applications. At the same time, banks were becoming more cautious in granting the loans, setting in this regard severe eligibility criteria for economic agents. Naturally, the number of banking units and personnel employed in this sector was reduced. In Romania, according to the National Bank of Romania (NBR), the number of units was reduced by approximately 1.000 from 2008 to mid-2014 while the number of employees was reduced by more than 10.000 during the same period.

At the same time there is a pressure in the banking sector to improve returns. In this respect it is expected for the banks to shift towards activities that generate economies of scale and to give up activities with a low profit margin or to those activities with a reduced growth rate such as clearing and securities servicing. This type of basic services can be instead outsourced; some banks such as ING already did that in Bulgaria, Romania, Czech Republic, Hungary, Slovakia, Ukraine and Russia (Beitel et al., 2013).

The regulatory process to which the European banking system has been subjected involves also, the strengthening of the capital base which is quite difficult to achieve given the market rigidities and the consumers lack of confidence in the banking system. The interconnections between the banks in the European Union (EU), severely affected by the crisis, and the ones in Romania have turned the domestic banking sector into a less efficient one, forcing the authorities to implement various measures such as the cleansing of balance sheets of non-performing loans.

The structure of the Romanian banking sector reveals the presence of 40 banks. Foreign banks continue to dominate the domestic market. Of the 40 banks present in Romania, 24 have foreign shareholders, 2 are fully or partially owned by the state, 9 are branches of foreign banks and one is a credit cooperative organization (NBR, 2014, pp. 21-22).

According to the information published by the National Bank of Romania in the Financial Stability Report for 2014, the market share of the banks owned by Romanian

shareholders doubled, reaching 19.8% in June 2014 from 9.4% in June 2013. This was primarily due to the reclassification of the ownership of the banks function of the country of origin of the main shareholder. Thus, in the first half of 2014, the first positions in the ranking of the banks based on the market share were held by banks with Austrian, Romanian and French ownership.

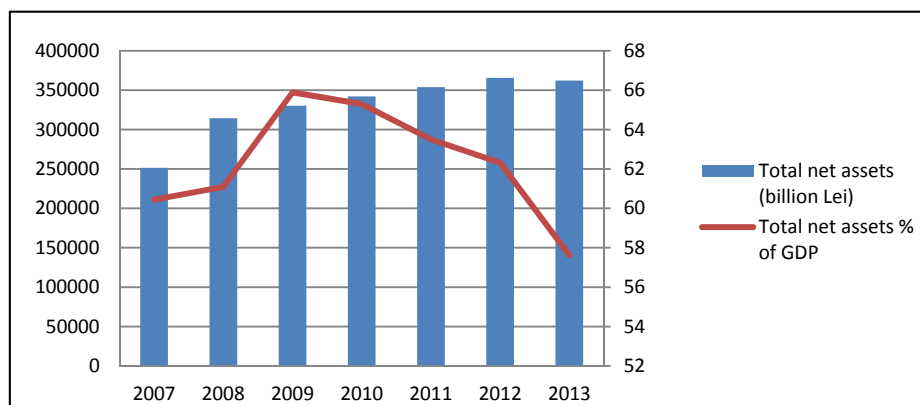
The difficulties faced by the banking system have also affected the prospects of economic recovery. According to the National Institute of Statistics (NIS), the gross domestic product (GDP) declined in quarter 2 of 2014 by 0.3% compared to the first quarter, and increased by 0,5% in the first quarter of 2014 compared to quarter 4 of 2013. Also, in quarter 3 of 2014 Romania has registered an increase of the GDP by 1.9% compared to the previous quarter.

2. Banking sector – influences on the economy

Banks play a central role in the economy; this fact is obvious, especially in Europe where the economy is highly dependent on the funding coming from the banks. However, such model can also have some negative consequences as difficulties in the banking system prevent banks to fulfill their role of main financier, which can condemn an economy to years of anemic economic growth in the absence of other sources of funding. The development and the awarding of a greater role to the stock exchange in financing the economic activity could represent an alternative in this regard. The analysis carried out by Nowbutsing and Odit in 2009 has shown that the development of the stock exchange has a positive effect on economic growth in countries where the stock exchange plays an active role and it is highly liquid.

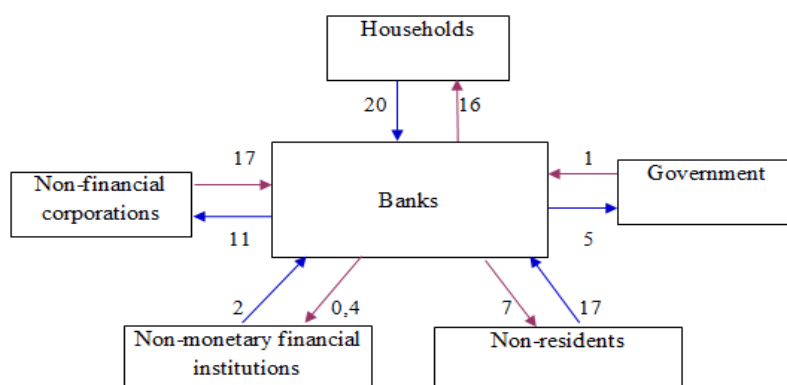
Regarding the size of the European banking sector, the total assets of the European banks to GDP exceeded three times the value of the GDP in 2013, according to the calculations made based on the OECD and Eurostat data. With such resources, the banking system has established the premises to perform its functions, especially those of financing the real economy.

Although still relatively small in size compared to other European countries, the Romanian banking sector contributes significantly to the financing of the economic activity. Calculated as total net assets the Romanian banking sector has reached 57% of the GDP in 2013, decreasing, as compared to the previous years (see Figure 1).

Figure 1. *The evolution of the banking sector size between 2007 and 2013*

Source: NBR, IMF - World Economic Outlook Database October, 2014.

The significant role of the Romanian banking sector in the economy may also be examined by analyzing the flows between institutional sectors – households, government, non-financial corporations, non-monetary financial institutions, non-residents and banks. As Figure 2 indicates, most of the funds available to the banks come from households, namely 20% of GDP, followed by the contribution of the non-residents 17%. With respect to the destination of such funds, the majority is directed towards funding non-financial corporations, namely 17%. Therefore, firms have the highest dependence on the financing coming from the banks, in Romania. In this context, the revival of lending represents a primary need for firms, in particular, and for the economic recovery, in general.

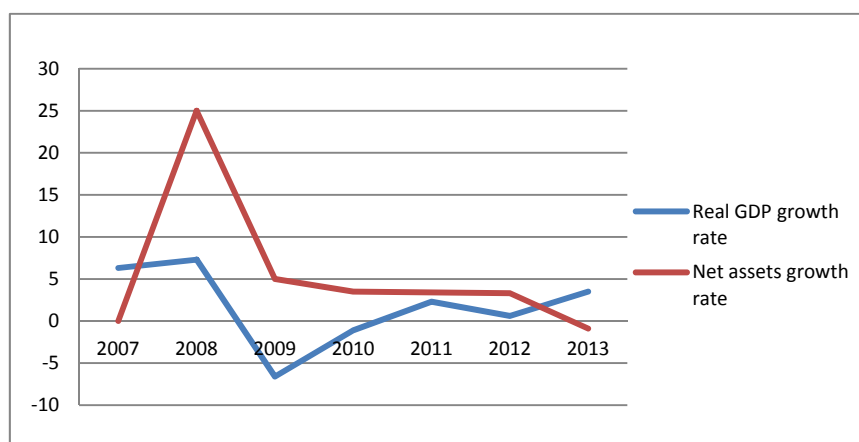
Figure 2. *The structure of loans/deposits by institutional sectors 31 December 2013 (% of GDP)*

Note: The red arrows indicate the amount of loans as a percentage of GDP and blue arrows indicate the value of deposits as a percentage of GDP.

Source: NBR, own calculations.

The banking sector has gone through a comprehensive process of development, growing at an even faster pace than the economy. Figure 3 shows the net assets growth rate of the banking sector as compared to the GDP growth rate. It can be noticed that the volume of assets increased at a faster rate than the GDP between 2008 and 2012. The net assets as well as the GDP recorded the highest growth rate in 2008, namely 25% and 7.3%. The extension of the banking sector in a faster pace than the business it is associated with the risks taken by the banks. For example, in 2009 the total assets of the Irish banking sector grew at a rate nine times higher than the growth rate of nominal GDP, not long after that, the country had to resort to international financial aid to avoid bankruptcy. The same situation was recorded in Iceland as well, the assets growth rate being only two percentage points lower than in Ireland, but still higher than the GDP growth rate. Not merely accidental failures rate was more pronounced in these countries. The risks assumed by the banks leading eventually to their bankruptcy. In countries where the assets growth rate was more moderate, although higher than the GDP growth rate, the consequences were less dramatic. It is the case of Australia, where the banking sector assets increased at a rate twice that of GDP, but significantly lower than those recorded in the European countries. During the crisis, the Australian banking system proved to be more solid (Edey, 2013).

Figure 3. *The evolution of the net assets growth rate and of the real GDP*



Note: The data for the calculation of the 2007 growth rate for the net assets are not available.

Source: NBR, Eurostat, own calculations.

The economic crisis has highlighted the need to review the European banking sector regulatory framework. Subsequent measures such as the increase of the capital base, risk mitigation and the cleansing of the balance sheets may nevertheless have different implications in emerging countries where the banking sector is not as developed. In Romania the deleveraging process represents one of the main problems. The withdrawal of the foreign banks funds in order to meet the new capital requirements in countries

where the mother-banks are located, can lead to a decrease of the loans granted in the place where their branches are located, which stifles economic growth.

In Romania the economic crisis had a negative impact on both the net asset and the GDP. The effects were felt immediately in both the banking sector and the economy; the economic downturn coincided with a tightening of lending. Six years after the economic crisis the banking sector still shows signs of weakness. In 2013 the growth rate of the total net assets was negative. However, economic activity showed some signs of recovery; in 2013 GDP growth rate reached 3.5%, being the second in the EU member states. According to the NIS the economic growth was based mainly on the contribution of the industry and agriculture.

In 2014 growth will be most likely a relatively modest one followed by a slight increase in the upcoming years. European Commission forecasts, revised downwards in the autumn report, estimate an increase by 2% for the Romanian economy in 2014, 2.4% in 2015 and 2.8% in 2016. The increase forecasted by the Commission is based on fiscal and monetary policy measures taken to stimulate growth. Thus, the fiscal policy pursued has allowed to decrease the social security contributions and to eliminate the tax on reinvested profit aiming to supplement the resources held by firms and to stimulate investments. These along with the measures aiming to stimulate lending, such as the reduction of the interest rates and of the minimum reserves is expected to support economic growth in Romania. The quantification of the effects of the two fiscal measures must be done cautiously because accompanied by other taxes, such as the taxes on special constructions the effects on growth could prove extremely modest.

The analysis of the interferences between the banking sector and the economy underlines the significant role of the banks in financing the economy in Romania. The risks assumed by this sector in the context of "rational exuberance" have led the banking sector towards a poorer performance. The suggestion favored by most of the economists is that the banks should revert immediately to their primary mission, of extending credit facilities to support the economic development, through the efficient use of financial resources that are attracted from the Romanian market (Dănilă, 2010).

Banks in their role of intermediaries mobilize funds from depositors to borrowers in order to finance the economic activity. The importance of the banking system differs from case to case. In countries where the funding comes from other sources as well, the contribution of the banking sector to economic growth may be more reduced, for example, in the United States where the economy is partially financed through stock exchange. Even so, financing the economic activities through stock exchange has certain limitations especially for smaller enterprises. Consequently, although in certain circumstances the funds from the banks have alternatives, the banking system as a whole has no genuine substitutes.

In a study regarding the relationship between economic growth and lending for the Central and Eastern European (CEE) countries it is shown that an increase of one percent

of the flow of credit (relative to GDP), causes an increase of about 0.32 percent in the economic activity (Moinescu and Codirlaşu, 2011). In the same study it is also shown that the banking sector interacts with the real economy through the credit accelerator mechanism, the analysis shows that the credit flow change explains between 30 and 70 percent of business development in CEE.

3. Banking regulations

The counter-cyclical policy practiced by the NBR has protected the Romanian banking system. At the onset of the financial crisis most of the banks were well capitalized and were not exposed to the toxic assets to the extent that the banking institutions within the other European countries were.

The economic crisis has restarted the process of consolidation of the European institutional framework by focusing on a profound reform of regulation and supervision of the European financial system. The establishment of a Banking Union is one of the most ambitious European projects in this sector. The establishment of this institution completes the Economic and Monetary Union preparing a uniform regulatory framework for the Member States, which allows the reduction of the uncertainties within the economy. The new regulatory framework will also ensure that all EU savers are guaranteed that their deposits up to 100.000 euro are protected at all times and everywhere in the EU. Since November 2014 the European Central Bank (ECB), as part of the Single Supervisory Mechanism, will supervise the 6.000 banks in the euro area. If the collapse some banks will be inevitable despite the careful supervision of the ECB, the Single Resolution Mechanism adopted, will allow a faster and an efficient action of the authorities in order to support the banks in question (European Commission, 2014, p. 2).

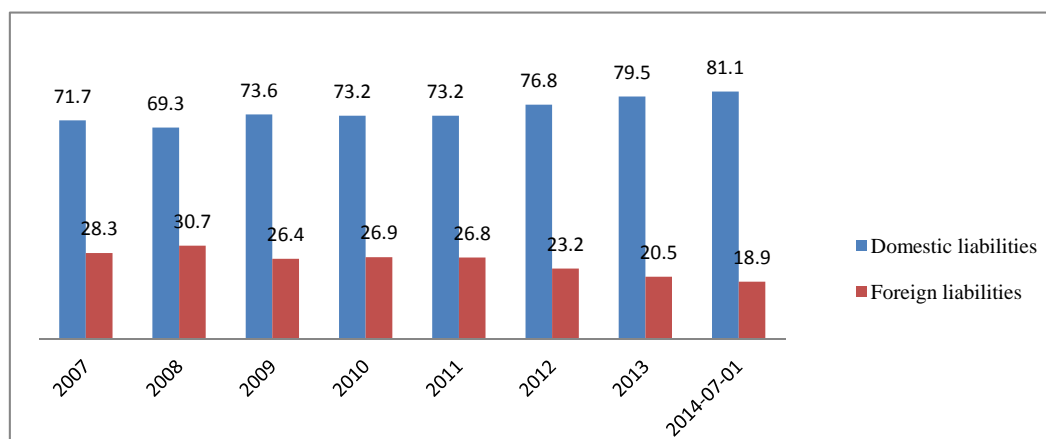
The accession of Romania to the new framework of economic governance is expected to be achieved before the adoption of the euro. The substantiation of this approach takes into account mainly the high presence of the Euro zone capital in the structure of the credit institutions registered under the Romanian law (Georgescu, 2014).

The accession to the Banking Union could contribute significantly to restoring consumers and foreign investors' confidence in the banking system, given the fact that the banking system would be supervised by the ECB. The access to information for the entire European banking sector could enable a faster identification of the system deficiencies and the correction of those deficiencies in due time. Although a possible accession of Romania to the Banking Union offers some solutions regarding the costs generated by the financial imbalances, it does not solve all the problems faced by the bank on the market such as, those related to bad loans. To this end, and in order to meet the new legislative requirements enforced, the Romanian banking sector has embarked on a comprehensive process of recalibration, aiming to strengthen the system. Given the existing imbalances in the EU and the problems faced by the banks within the Member States, the banking

institutions in Romania turned to attracting funding from domestic sources, initiative also supported by the NBR.

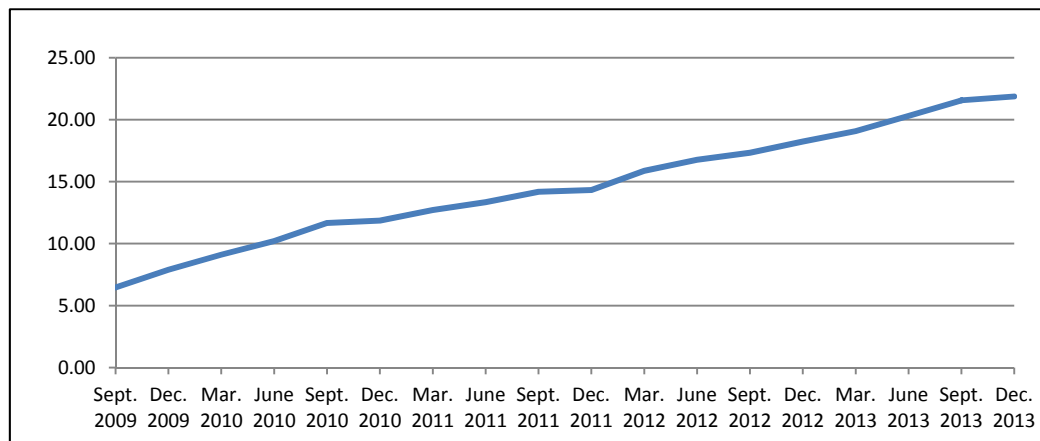
As the information presented in Figure 4 indicate, from the beginning of the crisis the share of foreign liabilities in the balance sheet decreased by approximately 10 percentages. That mainly reflects the restrictions on the credit lines extended by parent banks to their branches in Romania.

Figure 4. *Banking liabilities structure*



Source: NBR.

Another action taken in the banking system restructuring process envisaged the non-performing loans problem, based on the recommendations of the European Banking Authority (EBA) as part of the European System of Financial Supervision. The EBA objectives consider maintaining financial stability in the EU and ensuring the integrity, efficiency and orderly functioning of the banking sector. To this end, the NBR is empowered to conduct an assessment of banks loan portfolios, risk classification and provisioning, in order to ensure the availability of adequate levels of capital and reserves (EBA, 2013, p. 3). The application of the EU provisions regarding the quality assets evaluation and the cleansing of balance sheets puts pressure on the banks from Romania, which have recorded a steadily increasing level of non-performing loans (see Figure 5). Beginning with September 2013 the growth rate of non-performing loans slowed and it is anticipated that it would stagnate further. The process of cleansing the balance sheets of loans with delays in payments exceeding 90 days will be achieved mainly by selling these portfolios of bad loans. According to the NBR the banks in Romania still have certain reluctance in selling non-performing loans portfolios due to the low market prices, the uncertainties concerning the fiscal treatment and the right to the debtor at the time of the credit sale.

Figure 5. *The evolution of the non-performing loan rate (%)*

Source: NBR.

In terms of the distribution of credits on coins, in 2013 the largest number of non-performing loans was recorded to the loans in foreign currency. The monetary policy applied by the authorities encouraged the granting of loans in national currency to avoid shocks from exchange rate fluctuations. Thus, from the beginning of the crisis to present day the NBR has reduced the interest rate from 10,25% to 2,75%, and the reserve ratio to 10% for liabilities in national currency and 14% to liabilities in foreign currency.

Also, in order to control to some extent the increase in the burden of the loans in foreign currency, it was initiated a draft law for the Government Emergency Ordinance no. 50/2010 on credit agreements for consumers. The main provisions of this legislative initiative provide consumers the right to convert the loan contracted in an alternative currency within certain limits and subject to specific conditions. To this end we can find in section 2, art. 49¹, par. (2) of the Government Emergency Ordinance no. 50/2010 on credit agreements for consumers the following provision:

“(2) The alternative currency provided in para (1) is the currency in which the consumer receives its income or the assets that finance loan payment, or the currency of the EU Member State in which the consumer has either resided at the time the credit agreement was concluded, either currently residing, or any other currency requested by the consumer”.

And in section 2, art. 49², par. (2) of the same law it is stipulated:

“(2) The credit institution or non-bank financial institution shall ensure that, if a consumer has a loan in foreign currency, it is warned, on paper or on another durable medium, in cases where the amount total payable by the consumer, which remains to be reimbursed or regular rates vary by more than 20% to the value that would raise if it

would be applied the exchange rate registered in the moment that the contract was signed, between the currency in which the contract is made and the national currency.”

Granting the right to convert the contracted loan in the currency of the state in which the respective consumer has or has had resided without any proof of gaining incomes within that state is not sufficient and still involves risks assumption.

Allowing the consumer to contract loans in any currency he requests and then convert it into another currency in case of fluctuations higher than 20% could represent an alternative in order to avoid crisis such as the Swiss francs crisis. The absence of a link between the currency in which the loan was made and the currency in which the revenues were obtained has subjected the respective loan to a currency risk which made the loans more expensive during the repayment. Although the NBR has repeatedly issued warnings about these risks, these were mainly ignored or misunderstood by the population.

The draft law in its current form, even if it does not provide a complete protection to the consumer it is, however, reducing significantly the risks assumed.

Analyzing from the perspective of the effects that this draft legislation could have on the banking sector, it should be emphasized that, in the moment that the contract is signed banks transfer the currency risk to the customer and in return they charge a lower interest rate than the one charged for national currency loans, offering simultaneously the possibility of borrowing a higher amount. The draft law in its current form would convert this mutually beneficial exchange in a one-sided beneficial exchange.

4. Conclusions

The economic crisis has focused authorities' attention to the creation of a stable banking sector resilient to shocks. Although banks in Romania were not so badly affected during the crisis, its consequences were felt nationwide. Amid on these imbalances banks have restricted lending which caused a slowdown in economic activity. In this context and considering the relationship between the two variables, bank restructuring a priority for regulators should be made with caution, taking into account local particularities.

In Romania, the restructuring process takes into account the orientation of the banking sector to domestic sources of funding, this approach is found in most European countries. Another course of action in order to restructure the banking sector was the cleansing of the balance sheet and the review of the legal framework so as to avoid the occurrence of shocks due to currency fluctuations.

The NBR efforts directed towards encouraging lending in national currency, such as reducing the interest rate, the reserve ratio and the standing facilities corridor, have influenced lending, however, later than expected.

Acknowledgement

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Towards a sustainable economy

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Abstract. *Studies and researches on the deterioration of the ecosystems and the environmental services provided by the natural ecosystems have been undertaken and are under way even to this day on very many levels, some even in areas or domains having no connection with ecology or with the environment. The profound ecology demonstrates unequivocally that the natural and semi-natural ecological ecosystems produce resources and services, through the concentration of the solar radiant energy and through the maximization of the density of the energy flow. The primordial task the research have is the creation of a vision as widely accepted as possible on a sustainable society in the long run.*

Keywords: ecosystem, natural capital, sustainable development, socio-economic system, sustainable economy.

JEL Classification: O1; O3; P2; Q5; R5.

All the systems that make up the natural capital preserve the function of production of resources and services based on the fundamental ecological processes. This is why the energy flow coming from the solar radiant energy - which is free - and the recycling of the nutrients, namely the fundamental mechanism for maintaining the bio-geo-chemical circuits, are defining elements of the structure of the natural capital and of the ecological processes that generate products and services.

The preservation of the spatial and temporal organization, of the productive function, and also the control of the dynamics of these ecological systems, is realized only if the direct and significant intervention of the human populations actually controlling the socio-economic system is permanently maintained in the clear, namely within the limits of the supporting capability of the ecosystems, which are also the limits of their stability domain.

The daily reality shows that the anthropic intervention is direct both during the stages of creation of these types of ecological systems through the actual removal or total elimination of the components of the natural ecosystems and by the influence on some physical and chemical systems and especially on the bio-geo-chemical mechanisms starting with the sowing or plantation stages, species amelioration, fertilization, fighting pests etc., without which the ecosystems are practically disconnected from the functional hierarchy called environment.

One cannot approach correctly the issues related to the condition of the ecosystems and the use of the resources without taking into consideration at least three perspectives, triggered by different approaches of the environment:

- The economists' approach: they try to maximize welfare taking into account the constraints determined by the existing capital and by the level of the technologies. Along this line, the economists are rediscovering at present the importance of the natural capital and are trying to evaluate its products and services;
- The ecologists' approach: they emphasize the need to preserve the integrity of the ecological systems, which are all indispensable for the general stability of the global ecosystem. A more realistic approach accentuates the need to preserve these systems' elasticity and dynamic capacity of adapting to change, in answer to the pressure of the command factors, and not the need to preserve an "ideal" static state;
- The sociologists' approach: they underline the importance of the human nature, of the main "actors" and of the modes of social organization, both of them being determining for the discovery of some viable means of realizing a sustainable development; the experience shows that not giving enough attention to the social factor may endanger the efficacy of the different economic development projects and programs.

The present report is a debate that brings together all the three perspectives mentioned above, and the solutions mainly rely on the economic instruments for the organization of a sustainable development, yet, at the same time, try to integrate the ecological and social dimension of any enterprise.

An extremely important and complex problem facing both the developing and the industrialized countries is related to the discovery of the answer to the following simple

question: *can one support the economic growth, namely the increase of the Gross Domestic Product per capita without damaging the environment?*

This difficult problem cannot be approached except with the help of the concept of sustainable development

We need to mention from the beginning that the economic development is the increase in time of the general level of prosperity of the society, and the economic growth is the process of increasing the economy's capacity of producing goods and services, being the result of the growth of the volume of the production factors in use, of the increase of their qualitative level and of the efficiency of their use.

Consequently, the economic growth contributes to the development by providing supplementary goods and services, yet it represents just a part of the development.

Evaluation of the impact on the environment

The general goal of any research related to the condition of the ecosystems or the condition of the environment in general needs to include the identification and the analysis of the correlations between the macroeconomic or sectorial policies and the environment.

At the same time, the integration of the economic analysis with the ecological analysis of the investment projects, in order to promote policies orienting the public and private initiatives and investments on the way towards sustainable development supposes:

- substantiating the imperative of introducing the studies evaluating the impact even since the incipient stage of the projects;
- presenting the methodology for the integration of the studies evaluating the impact, in the economic analysis of the projects;
- identifying the possibilities of turning to good value the inputs (factors) and outputs (results) with no price on the market;
- identifying and examining some non-economic indicators used in the decisions related to the project;
- presenting the methodology for using multi-criteria analyses in selecting and evaluating investment projects.

In general, the environmental impact means any modification, be it positive or negative, of the environment, determined partially or as a whole by the activities, products or services of an organization.

It results that the study evaluating the environmental impact represents a formal study, whose aim is to estimate the environmental consequences triggered by the activities, products or services of an organization.

The departure point in the determination of the environmental protection priorities, under the conditions of the resource limitation, is the determination of the costs triggered by the environmental damage and the benefits resulted from a good management and the use of these elements in the decisional process.

Natural capital. Renewable and non-renewable resources

The definition of the natural capital via the way of perceiving the physical, chemical and biological environment, as representing the totality of the natural and semi-natural ecological systems, permits a new approach of the management of the ecological systems.

The natural ecological systems are, in this case, interpreted as self-maintained systems on which the direct anthropic influence is absent or very limited, in general, triggered by activities meeting the basic needs of the local population, research needs and, more recently, ecotourism.

The semi-natural ecological systems are represented by systems which, although bearing a direct anthropic influence, for instance the industrial exploitation of the renewable resources, preserve the structural and functional features by which they produce resources and services, maintain themselves and grow.

The basic feature of the natural and semi-natural ecological systems is that their productivity and stability does not need a supplementary input of energy produced in other systems.

The direct activities of exploitation of the resources from the semi-natural systems or the activities of control of certain command factors require a current management process. These ecological systems functioning in a semi-natural regime are represented by:

- the agro-systems responsible for the production of cereals, vegetables, fruits, technical plants and fodder plants;
- secondary forests or forest plantations for the production of wood;
- animal farms, for the production of food of animal origin and raw matter for the leather industry, farms for aquaculture in general, and for intensive fish breeding, in particular;
- storage lakes created for the exploitation of the hydro-power potential, as a renewable water source and for the exploitation of the fish-breeding potential etc.

The anthropic intervention is direct both during the stages of creation of these types of ecological systems through the actual removal or total elimination of the components of the natural ecosystems and the alteration of some physical and chemical environments and especially of the bio- geo-chemical mechanisms beginning with the stages of sawing and plantation, species improvement, fertilization, pests elimination etc.

We will underline the fact that the semi-natural ecological systems produce resources and services, through the concentration of the radiant solar energy and the maximization of the energy flow density. For example, the humid areas are ecological systems with an intermediate position between the land and water systems, and they are characterized by their capacity of cleaning the surface waters, due to mechanisms generated by the fact that, for instance, periodically or permanently, the soil is covered by hydrophile (water-loving) species, in which a specific fauna, able to recycle the nutrients, develops.

Practically, however, most of the natural and semi-natural ecosystems are intertwined, both with one another and with the anthropized ecological systems.

All the systems that make up the natural capital preserve their function related to the production of resources and services relying on the basic ecological processes. For this reason, the energy flow from the radiant solar energy, which is free, just as the recycling of the nutrients – the fundamental mechanism for the maintaining of the bio-geo-chemical circuits – are defining elements of the structure of the natural capital.

At the same time, it is considered that the maintaining of the spatio-temporal organization, of the productive function and also the control of the dynamics of these ecological systems are realized only if the direct and significant intervention of the human populations is assured permanently and in a non-damaging way.

Seeing their strict dependence on the direct and complex intervention of the human populations, associated to a flow of auxiliary energy produced in the energy conversion systems, it can be stated that these ecological systems have structural and functional features specific to the anthropized systems and, consequently, we consider them part and parcel of the structure of the socio-economic systems.

In fact, a third of the total of the agro-systems, for example, are intensive and super-intensive production structures, calling for a very significant auxiliary input of energy, which can reach values of 10 kcal/m²/year. Therefore, such ecological systems are no longer natural or semi-natural; they are assimilated to the components of the capital built by the human populations.

Finally, this last category of ecological systems is considered as representing components of the natural capital dominated and controlled by the human populations and, consequently, we say that these ecological systems are subordinated from a structural and functional perspective to the development strategies of the socio-economic system, demonstrating in this way that they are practically integrated in the socio-economic system.

Moreover, as a piece of evidence supporting the resources depletion, it is considered that the weight of this category of ecological systems has grown exponentially during the last century, simultaneously to the demographic growth and especially to the increase of the basic needs of the human societies, and the numerical growth of these systems is evidently the result of a process of substitution of the natural and semi-natural systems.

We do not exclude, therefore, the possibility of substituting, within certain limits, some components of the natural capital, by others, in order to increase productivity, yet the substitution accompanied by the significant growth of the energy flow produced in other processes is not acceptable.

The comments on the extremely controversial issue, regarding, on the one hand, the possibility and the opportunity of substituting the components of the natural capital by components created by the human populations and, on the other hand, the obligatory request of guaranteeing their complementariness should lead to the conclusion that always the normal evolution is towards the harmonization of the spatial relations and of the matter and energy flows between the natural capital and the socio-economic system.

We shall reiterate the fact that all the components, in a natural, semi-natural and anthropized regime, are dissipative systems, which maintain and maximize the energy flows and which recycle the raw matter, producing resources and services.

In this way, all the ecological systems are dynamic on large, geological timescales and develop by going through different growth stages, depending on which they produce resources and services. It results, logically, that on large, ecological and geological timescales, all the resources are renewable. Yet, the management of the socio-economic systems relies on strategies emitted for much shorter timescales, namely 5-15 years, so in this case their management cannot be operable by comparison to the timescales at which the resources are renewable.

This is why in the category of the renewable resources we can only include the vegetal and animal biomass, most of the soils and water reserves and partially the mineral resources usable as construction materials.

The ores and the fossil fuels such as coal, oil and natural gas have a replacement time of the order of several hundred thousand or million years, which determines their inclusion in the category of the non-renewable resources.

From a managerial perspective, the distinction between renewable and non-renewable resources is extremely important, because it leads to the conclusion that the renewable resources need strategies for the conservation of the functional integrity and productivity of the components of the natural capital, maintaining the exploitation rate under or very close to the rate at which these resources are produced. For the non-renewable resources, however, flexible strategies are needed, which should include measures for the limitation of the exploitation rates, the identification of alternative sources and especially, technical measures for the bio-geo-chemical recycling of the products obtained and of the residues.

One of the essential features of the natural capital, which has almost always been neglected, is its structural and functional diversity.

The presentation of the problems up to this stage allows us to highlight the structural and functional aspects of the ecological systems, which are in fact arguments in the substantiation of the new socio-economic development model, namely the sustainable development.

Consequently, the new way of development does not suppose only the need of maintaining the natural capital as weight above a critical level, but supposes especially the need for it to preserve its maximum level of structural and functional heterogeneity, on which the long term development opportunities will actually depend.

Consequently, the issue of the conservation of the biological and ecological diversity is not a collateral problem representing just a difficulty for the political decision-makers, but it is actually the very problem of the conservation of the natural capital as support of the development and guarantee of the sustainability.

The last 2-3 decennia of the last century have been marked, incomparably more than any other period in mankind's history, by the obvious process of deterioration of the environment, noticeable through the toxic, often lethal effects of the secondary and final products resulted from the processes of the socio-economic systems. These products have gathered together and have been concentrated in the major environmental spheres (troposphere, lithosphere, and hydrosphere) and have damaged the taxonomic hierarchy of the biosphere, simultaneously to the degradation of the abiotic environment.

Towards a sustainable development

The reactions to the tendencies of degradation of the environment through damaging anthropic activities have diversified, by and by, as the effects have been perceived, evaluated and correlated to a series of concrete human activities. Consequently, different, increasingly diverse actions have been designed to delimit the pollution effects and, very recently, to decrease and prevent pollution.

To the tendency of alarming increase of the process of elimination of different plant and animal species, a phenomenon generating a worrying narrowing of the biodiversity, it has been answered, at first, mainly by actions of identification of the vulnerable and endangered species and through the elaboration of some special protection programs for them. At the same time, for the endangered habitats, actions of ecological reconstruction have been taken, avoiding in this way the imminent elimination process.

The real process of erosion of the biological diversity following the aggressions of the socio-economic system could not be stopped using sectorial protective approaches related to certain species or the reconstruction of some endangered habitats. Therefore, organisms like the EU or UN have felt constrained to adopt regional or global conventions for protecting the biodiversity.

The restrained meaning of the biodiversity concept could be maintained by the supporters of the "development at all costs" until close to the beginning of this millennium, namely after the Rio de Janeiro Conference (1992).

The conclusions of the conference imposed the adoption of the "Convention on Biological Diversity", which, although adopted, signed and ratified by all the signatory states, is very hard to operationalize from one country to the next, before approaching and commenting on the coordinates and restrictions resulting from the application of this convention.

Two mentions are necessary, which will help us distinguish between biodiversity in a broad sense and biodiversity in a narrow sense, promoted by those supporting a "development at all costs":

1. For a long while, this concept designated only the richness of species without considering the diversity of the structural and functional units constituted by the abiotic environment.
2. The socio-economic systems, which include a great diversity of the social, cultural and patrimonial capital, were not taken into account when talking about biodiversity.

It results that we can affirm the following possibilities:

- Actually, the broad sense of the biodiversity concept includes the totality of the organized units that constitute the natural capital, the human species and all the capital created by it.
- Under these circumstances, the diversity of the ecological and biological systems would be a more adequate term for the biodiversity concept in a broad sense.

Thus, the conservation of the biological diversity needs to be designed and realized based on strategies, programs and methods that pursue, on the one hand, a sustainable use, namely within the limits of the carrying capacity of the components of the natural capital, and, on the other hand, the management of the development of the socio-economic system, namely of the capital created by the human populations.

The extension and operationalization of the biodiversity concept was necessary because of the numerous attempts of narrowing the different forms of biological diversity, in order to defend new techniques of degradation of the ecosystems.

The approach of biodiversity according to the above-mentioned plans generated numerous controversial debates, organized mainly by international organisms of this domain such as FAO, UNESCO, the European Council, debates that involved, on the one hand, governmental experts, and on the other hand, representatives of the scientific research and of the international funding organisms. Unfortunately, the governmental experts and the experts of the important funding bodies still have the tendency to interpret biodiversity restrictively, defending the view that the degradation of the environment is a normal process accompanying the technological development and the solution can be found by new developments.

We need to mention that the summits from Rio, Johannesburg, Copenhagen and many other meetings on a regional level or with a more restrained attendance prove that the political decision-makers have understood to give up on speculative arguments and have found themselves forced to adopt, at least formally, clear measures for the prevention of the environmental degradation.

The political decision-makers, as well as the managers, have been obliged to admit that important for the long-term development is the creation of the conditions needed for a sustainable development and implicitly for the conservation of the biodiversity.

The acknowledgement of this necessity on a large scale has been defended at least by the following arguments:

- The effort for the preservation of the biological diversity cannot focus only on the natural ecological systems, based on the reason that they would integrate almost all the species, of which most are still not studied.
- It is necessary to also preserve, to the same extent, the habitats assuring the complex fundamental ecological processes and, naturally, to avoid the elimination of certain species.

The conservation or maintaining of the structural-functional integrity within the stability domain of a given natural or semi-natural ecological system involves, to the same extent,

the maintaining of the course of the dynamics of the abiotic and biotic sectors but also of the interactions between them.

Thus, the term of interconnectivity has been introduced, which represents the necessity of a permanent intercommunication of the components, in the sense of support for life, one for the other.

Consequently, when the development of each ecological system is analyzed as a complex long-term process, the general tendency is to assure the mechanisms by which the number of species or populations may increase, without taking into consideration the need of having, within, them, specializations and interactions able to increase the environmental services, such as maximizing the energy flow, recycling the nutrients, regulatory mechanisms, balance and stability mechanisms etc.

The result of such a process appears, therefore, in the extension to the spatial scale of the stability domain, and the analysis on a time scale specific to large systems would be obligatory.

It results that by no means can one talk about the existence of useless species in the context of a complex model, but in different growth stages, the functioning of the ecosystem successively relies on one or the other of the species included in the taxonomic hierarchy.

Consequently, even though at the same time, not all the distinctive elements are equally important at the spatio-temporal scale at which the ecosystem is analyzed, every species has its distinct role.

It results, logically, that for the preservation of the ecological structure on the scale of the national and macro-regional complexes, it is necessary to take into account the maintaining of a mosaic of natural and semi-natural systems, which should include all the types of ecosystems and preserve at least half of their surface. The preservation of the ecological systems therefore involves their interconnectivity, which is assured by natural corridors or, where they are missing, such corridors should be reconstructed technologically and ecologically.

The connectivity of the natural and semi-natural systems is an essential condition for the spreading of the species within their area, for their movement, for the directions of the new gradients modified because of the climate changes, the consideration of the elements highlighted actually requiring operational policies and strategies on the level of the states or state unions.

The European Council has established, on the occasion of the reunion of the environmental ministers from Sofia in 1996, that, on the European level, it is necessary to create a European network of ecological systems interconnected by means of management programs, which should comprise the preservation of the natural and semi-natural systems specific to the different European regions, the reconstruction of some endangered habitats, the rehabilitation of certain ecosystems and also special sustainable management programs for the anthropized systems.

The development specialists have begun to rethink the strategic directions, trying to reconcile the economic growth and the biodiversity preservation in a credible manner. As long as everything remains on a declarative level, eventually with small positive examples in an ocean of degradation of the natural substratum, it is obvious that what is needed is a change of paradigm. Regional planning means understanding the dynamics of the processes, understanding the relations and the interdependences and establishing the values we care for, aware that our survival is not possible in their absence. Often, the same piece of land is desired by the farmers, by those crazy about developing the infrastructure and by those who wish to preserve the natural values and the ecological coherence. In this competitive process, it is possible to win the preservation of the natural values, yet in general, the major interest in the long run, namely of maintaining the ecological substratum, is lost to the minor momentary interest of creating parking lots and golf courses.

All these are necessary since the diverse biological systems actually hold a huge genetic fund, an immense genetic information bank, a fund assuring, on the one hand, the natural process of species dynamics, and, on the other hand, information for the technological research concerning the correct dynamics of the anthropized systems and the correction of their trajectories, by imitating nature.

Very recently, the term bio-industrial development or bio-geo-eco-development has emerged, in the sense of avoiding the negative tendencies generated by the idea that man rules over nature. It is therefore admitted that the anthropic factor, though being the command sub-system, is part and parcel of the system.

Moreover, during the last decennium, there has emerged the idea of creating a complementariness between the top industries of the developed countries and the diversity of the genetic resources of the underdeveloped countries, in the sense that by the "Convention on Biological Diversity" the developed states committed to returning at least 20-25% of the profits obtained through the exploitation of the genetic patrimony to the underdeveloped countries.

These financial resources would have the role of financing the increase of the surfaces of the so-called "protected areas", namely the very preservation of this invaluable genetic patrimony, the main support of life on our planet.

Conclusions

The very recent research has approached the issue of the ecosystems' carrying capacity, a problem addressed by both the specialists in demography and the specialists in human ecology, to be able to estimate, based on scientific grounds, the limits of the natural development and demographic growth.

The carrying capacity is a feature of every ecological system or category of ecosystems, depending on their development stages and the hierarchic level they are part of. Consequently, the carrying capacity is the concrete expression of the stability domain

expressing the ability of the ecosystem of changing its structural and functional parameters under the influence of the command factors.

The stability domain of an ecosystem designates the direction in which it is developing, with the mention that the process unfolds at very large time scales, of over 100 years and that it is reversible, whenever a strong impact is exerted on the system by external factors.

It results, in this context, that the notion of “carrying capacity” actually concerns the functioning capacity of the large, complex and dynamic systems, such as the ecological systems.

At the same time, to each ecological system one can associate a certain productive capacity on the goods and services production level. This capacity is concretely expressed depending on the fluctuations of the command factors, namely on the trajectory the systems are following.

Thus, in any socio-economic system, a healthy, namely sustainable, growth, has to be calibrated in the sense of its harmonization with the productive and carrying capacity of the natural systems, which assure both the matter and energy resources, and a series of services on which the health of the human population depends.

Starting from these considerations, one can state that the development of the society, supported by the economic growth, is healthy only if this growth gradually changes, by and by, as the limits of the carrying and productive capacity of the natural capital are attained, via a structural and functional improvement process.

The process needs not suppose either the increase of the matter and energy flows from the natural systems to the socio-economic systems or the storage of wastes inside the socio-economic system and dangerous substances in the environmental components such as the troposphere and the hydrosphere.

At least during this stage, when numerous aggressions on the natural capital can be noticed, the management of the socio-economic system needs to suppose an alternation between the economic growth and the structural and qualitative improvement, which means the ecological reconstruction of certain degraded environments that cannot be otherwise rehabilitated. By means of ecological reconstruction actions it will be possible to cover, at least in part, the debt of the socio-economic system to the environment and, on this basis, the premises of new growths will be created.

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The role and influence of the political factor in establishing the financial and budgetary balance and on national stability

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Abstract. *Financial-budgetary balance and political stability are two concepts strongly interconnected and interdependent.*

While political instability can lead to serious violations of financial and budgetary balance, financial and budgetary imbalances can lead to changes of government and, especially, to serious political unrest. No matter the type of imbalances and how they manifest, their effects are quantified into frustration and discontent and they cause the accumulation of real social tensions and threats against national stability. For these reasons, political action must observe a moral or ethical framework, supported by institutions whose role is to define a general direction.

Keywords: State budget, Government public debt, efficiency, financial and budgetary policies, political instability.

JEL Classification: E6.

1. Introduction

Any strategic analysis and perspective must be synthesized in a spatial and temporal context. One of the fundamental concepts of economic science is the concept of efficiency. If resources were not scarce there would be no major problems. And since resources are limited, they should be exploited at maximum; a problem which has an infinity of solutions. Wisdom in politics is not the wisdom of scientists, philosophers or economists; it is an art of execution.

Good functioning of market economy is not a „laissez-faire”; it is not the law of the jungle. To believe in human rights means that first you have to enforce them by developing culture and institutions like justice to materialize them. Human rights must be placed on top of the pyramid of norms because of the fact that they impose limits on the possible actions taken in the name of other values and force politicians to stick to certain landmarks in their continuous “movement through the fog”.

Political principles cannot be reduced to utilitarian calculations, if only due to the uncertainty that surrounds the consequences of any decision.

When it comes to any decisional issue, the specialist’s opinion is never neutral. In the complexity of budget management, politicians do not have the same approaches as the specialists, they don’t have the same opinions or the same information as the one who is responsible for his/her actions and who must face the consequences of these actions.

For these reasons, information - as product of economic and social activity - is a real “minerals of the future”. Well substantiated and well used information can replace substance and energy and other information. To treat service expenses that come from society (education, science, art, health, etc.) as net value consumption is a serious error, because they are actually investments in human capital with effects of multiplying the natural and social potential they introduce into the economy.

2. Methodological approach

The objective of this article is to shed light on the role and influence of the political factor in the management of financial and budgetary balance and of stability in Romania during the post-crisis period (2009-2014).

Different types of actions are analyzed, as well as their effects and the evolution of the barometer of efficiency of public policies and Government public debt.

From a methodological perspective, the paper is a critical analysis of the role and influence of the political factor in the achievement of financial and budgetary balance and of national stability during the post-crisis period (2009-2014).

Changes in government are presented by periods, from the Revolution and until the present, namely ten such changes between 1989 and 2009 and six after 2009.

Different types of actions are presented from the perspective of public finance, which have generated political instability and have affected the financial and budgetary balance.

What is noteworthy is the concise presentation of the fluctuations of budget forecasts between 2009 and 2014 and their effects on good financial management.

The analysis of the effects of public and government instability extends over public debt as well, which is presented in brief.

3. Bench-marks of political medium in Romania

The specialty literature reveals that there is an undoubtable connection between budget expenses and the political factor.

Thus, the “Leviathan” model (Caplan, 2001, pp. 825-847) underlines the fact that the existence of competitiveness between political forces may reduce the size of the public sector and the level of expenses as well.

On the other hand, the “Partisan” model (Boyne, 1994, pp. 210-222) reveals that left-wing governments prefer a larger public sector and increase taxes and expenses, while right-wing governments do exactly the opposite.

Although the aforementioned models vary from country to country and according to the political specificity and the political situation in each country (Zai, 2008, p. 142), the conclusion is that there is an undoubtable connection between financial and budgetary balance and the stability of a nation.

After the Maastricht Treaty, the stability of public finance and the reduction of budget deficits and of public debts have been the main concerns of most of the governments in the Member States of the European Union, in order to reach the convergence objectives and ensure a harmonious development thereof.

It is easy to anticipate that the political factor which has the power of reaching such objectives has not undertaken and it is very unlikely that it will undertake decisions that lead to short-term gains in popularity. The promotion of budget policies focused on emphasizing deficits, although it creates certain effects of wellbeing on the short and very short term, may affect price stability and the potential for economic growth on medium and long term, especially if the effect of using public funds is to stimulate non-government consumption.

Also, it is hard to believe that, in the absence of strong restrictions from a legal, institutional or supranational perspective, governments would willingly adopt just measures or the adjustments necessary to keep or reestablish the budget balance.

In the concrete case of Romania, the political instability of recent years can be analyzed through the number of post-Communist governments, as follows:

- The interval prior to the start of the economic crisis 1989-2009 (19 years), 10 governments.
- The interval subsequent to the start of the economic crisis 2009 – Present (6 years), 6 governments.

Thus, we find that the traditional difficulties and tensions existing in the relationship between the budget and the political factor which result exactly from the major differences related to the role, influence, objectives and typology of the two components, are heightened in Romania's case by the political and governmental instability of recent years.

From the perspective of public finance, political instability acts mainly with regard to the State budget, through various types of actions, like:

- difficulties in the elaboration/rectification of the State budget related to the electoral year/years and the occurrence of exceptional expenses;
- the unpredictability of political decisions on the budget amounts allocated to the different categories of entities through the State budget, irrespective of the type of budget (new/rectified State budget);
- reservations in taking decisions related to the objectives of the fiscal policy on the medium and long term;
- postponing the endorsement of the draft State budget law by social partners;
- possible deficiencies in communication and institutional and inter-institutional collaboration;
- frequent changes of the Government and/or of the government mechanisms;
- reservations in taking decisions and resistance to change etc.

4. Influence of the political factor on budgetary balance and national stability

In order to illustrate the effects of the aforementioned actions on the State budget, between 2009 and 2014 (post-crisis) the fluctuations of the budget provisions (State budget) will be analyzed, calculated as a difference between the initially approved budget and the final (rectified) budget, as well as the evolution of the barometer of public policies' efficiency: the government public debt.

The table below synthetically presents the fluctuations of budget provisions (State budget) with details about the main types of income and parts of expenses between 2009 and 2014:

Table 1. *Changes relative to the initial annual budget provisions between 2009 and 2014*

Fluctuations of budget provisions between 2009 and 2014 (difference between the final provisions and the initial provisions) Lei

Indicator names	2009	2010	2011	2012	2013	2014
Corporate income tax	-2.120.000.000	-1.597.000.000	535.715.000	-91.800.000	-916.800.000	624.900.000
Personal income tax	-1.765.815.000	-1.194.002.000	332.567.000	1.331.739.000	-308.000.000	-954.455.000
Shares and distributed shares from the personal income tax (to be deducted)						
Value-added tax	1.452.200.000	1.090.592.000	-256.040.000	-1.004.276.000	102.057.000	663.240.000
Distributed shares from the VAT (to be deducted)	-9.011.400.000	3.501.200.000	1.458.000.000	2.128.500.000	-138.800.000	-704.600.000
	148.629.000	1.612.144.000	-322.814.000	-1.891.660.550	-1.397.793.000	-4.424.635.150
Excises	-2.914.200.000	-528.200.000	1.283.200.000	-708.100.000	-1.108.089.000	-184.100.000
Income included in the EU budget's own resources						
	-481.100.000	-133.500.000	27.620.000	64.280.000	-150.000.000	3.000.000
Property income	-2.568.532.000	1.932.812.000	-570.785.000	-106.677.000	-953.349.000	521.035.000
General public services	6.560.559.000	3.139.913.000	-1.041.797.000	1.437.596.450	-2.718.209.230	-1.601.850.150
Defense, public order and national safety	-849.196.000	-981.937.000	1.053.716.000	1.078.752.000	1.623.452.000	2.559.401.000
Social and cultural expenses	-1.277.682.000	600.269.000	1.120.920.000	-100.890.000	-409.909.770	400.300.000
Public development, dwellings, environment and water related services	-357.396.000	208.189.000	613.076.000	-882.214.000	283.107.000	1.364.815.000
Economic actions	-423.446.000	2.033.418.000	2.949.706.000	-2.287.107.000	88.453.000	-2.268.631.000
Maximum fluctuation	6.560.559.000	3.501.200.000	2.949.706.000,00	2.128.500.000,00	1.623.452.000	2.559.401.000
Minimum fluctuation	-9.011.400.000	-1.597.000.000	-1.041.797.000	-2.287.107.000	-2.718.209.230	-4.424.635.150

Source: Own calculations based on Ministry of Public Finance.

We find that no matter the type of income or expense considered, the amounts provided in the annual budget laws have suffered significant amendments compared to the level approved initially.

Thus, we notice that although the biggest adjustments have been made with regard to the value-added tax and the part of the expenses for General Public Services (it includes expenses related to public debt), which are perfectly explainable in the framework of the effects of the global economic crisis, there are considerable changes compared to the initially approved values for the entire period under analysis and for all the categories of budget revenues/parts of expenses, irrespective of their type.

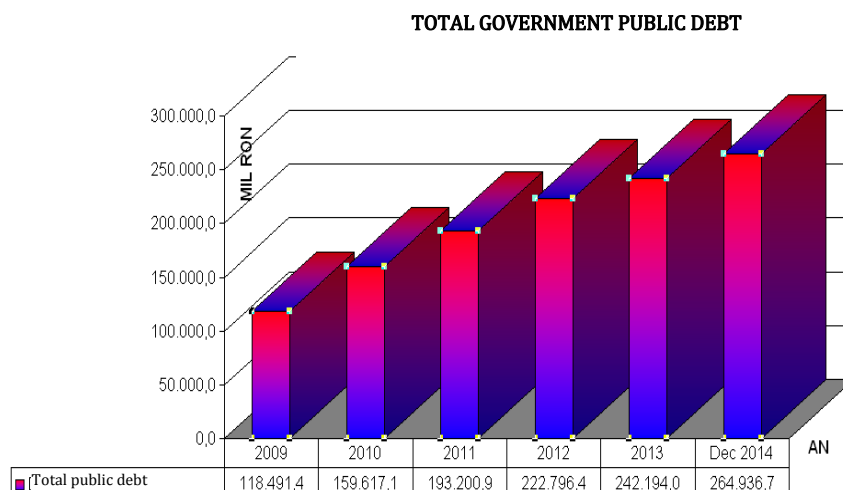
The uncertainty of the fiscal and budget policy is a less visible and harder to quantify cost, but it makes difficult the duty of public institutions of developing medium and long term plans and fuels the uncertainty of the actors involved (public/private entities).

Another indicator that is extremely important in the mission of quantification of the effects of political and government instability is public debt – it can supply an accurate image on the efficiency or inefficiency of these policies to the outside environment and to public entities. The public debt indicator is a sensitive and realistic barometer of the effects of government policies and it reflects in the first place the capacity and ability of different governments of covering the expenses with the available resources.

The detailed analysis of the government public debt indicator between 2009 and 2014 indicates a constant tendency of growth during the 6 post-crisis governments and reveals

financing needs that follow an ascending trend. Thus, in December of 2014, the value of the government public debt is of Lei 264,936.7 million (EUR 58,874.8 million), which is a growth of approximately Lei 146,445.3 million (EUR 32,543.4 million), compared to the level registered in 2009, and of Lei 118,491.4 million (EUR 26,331.4 million).

Graph 1. *Evolution of the total public debt between 2009 and 2014*



Source: Own calculations based on Ministry of Public Finance.

The main consequence of the increase of public debt between 2009 and 2014 is that the volume of related costs has inevitably increased, as well as that of total public expenses, and it has led to increased financing needs (the contracting of new loans, or the increase of income) and the increase of public debt per capita.

On the long term, the effects of such political behaviors have a direct influence on the increase of the fiscal burden of the population, which, corroborated with the big discrepancies in terms of economic development – which are more and more accentuated by unprecedented technological progress – can generate frustrations and discontent and cause the accumulation of social tensions or the occurrence of social crises.

The history of transition to market economy has taught us that lack of coordination between economic policies and political hesitations make it so that frequent economic adjustments are needed, which are costly from a social perspective (inflation, unemployment, debts) (Dănilă, 2010, p. 1).

In the framework of economic globalization, social crises are accompanied not once by identity crises, which generate unexpected violence (Parliament of Romania, 2001, p. 7) – thus representing real threats to national stability.

It is exactly due to these reasons that we appreciate that the continuance of government policies and reforms, the stability of the political environment and the adoption of coherent political decisions focused, on the one hand, on the development of the national

economic potential and, on the other hand, on covering budget deficits with savings and resources coming from “intelligent” (Government of Romania, 2010a, p. 5) operations, represents the expression of a national economy that has a real contribution to the safety of the individuals and ensures at the same time the minimization of the unfavorable potential that the accumulation of social tensions caused by the excessive fiscal burdening of the citizens can have.

Therefore, an efficient management of the economy and of public finance through a responsible use of the budgetary financial instruments and the adoption of new approaches of the budget and financial policies by the political factor which must make choices of rational and intelligence expenses, analyze the costs of the actions it undertakes and redesign the expenses in order to obtain maximum effects with limited resources (Government of Romania, 2010, p. 6), will have positive effects both with regard to economic security and with regard to national stability.

5. Conclusions

In a framework in which separation of powers, decentralization and administrative autonomy are configured as foundations of social reality, not only as social representation, the organizational structures of the administration are created at State level and generate the public administration both at central and at local level, where the local public administration is configured. We must show that in public institutions management efficiency is a constant influenced by the quality of civil servants.

Typologies of relationships between different components of the system must be applied, described and elaborated, as follows:

- relationships with authority;
- relationships of cooperation;
- relationships of representation;
- relationships of audit and control;
- relationships of services provision.

From a legislative perspective, public administration reform exists on paper, but the institutions, committees and commissions appointed to contribute to its enforcement have not actually worked, some because they were never established and others because it have very low budgets.

Public function, decentralization and processes of formulation of public policies are segments which require improved reforms in the near future.

Civil servants must be educated to have straight spines, no political involvement and, most importantly, they must be motivated both morally and materially.

Turbulence and uncertainty in the modern work environment of public entities impose the establishment and use of professional management, the need to resort to strategic planning, to early warning systems and, especially, to the elaboration of program budgets and multiannual budgets on all budgetary segments.

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European integration, as an approximation of globalisation: a statistical analysis based on stratified entropy indexes of concentration

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Abstract. *The paper tries to document the process of economic concentration at EU level and demonstrate that it could be seen as an approximation of globalisation. The phenomenon of economic concentration across the EU countries is highlighted by calculating entropy indexes of concentration for several layers (local and regional, regional and national, national and European), two by two, in a successive manner. By using Eurostat data, the values of entropy indexes document an increase of economic concentration from layer to layer, local to regional, regional to national and national to European level and suggest that the European economy could be seen as a globalized and stratified one, built from several economic layers and based on an increasing economic concentration from lower to higher layer.*

Keywords: economic concentration, globalisation, European integration.

JEL Classification: F01, F15, F62, O52

1. Introduction

Economic concentration across EU countries is a preferred topic for European researchers due to the relevance of their possible findings for the EU policies related to European Single Market and convergence of regions and European territories, social, economic and territorial cohesion.

Several authors discussed on the European integration process as an approximation of an advanced globalisation and a European model of globalisation was developed.

The focus of the paper is to prove, by using stratified statistical indicators, that concentration of economic activities across the EU countries, from local to community level, could be seen as a factor European globalisation process. The conceptual aspects of the paper are based on the theme of a European model of globalisation and on the fact that the globalisation is a phenomenon of concentration of national economies.

The paper is organised as follows: after a section dedicated to literature review on the concept of economic concentration, conceptual considerations on European globalisation are exposed in the next section, then data and methodology of the study are described in a special section, then the main findings of the study are exposed and conclusions are summarized in the final section.

2. Literature review on the concept of economic concentration

Concentration of economic activity across Europe was studied and analyzed by several authors in relation to specialisation as faces of the same coin and opposite phenomena (Aiginger, 1999; Aiginger and Leitner, 2002; Hallet, 2000; Aiginger and Davies, 2004). The interest of European researchers to these topics was generated by their concern to explain the process of European integration, competitiveness in the European Union and to suggest policy measures generally, and especially, for building the European Single Market. According to Aiginger (1999) there are at least two reasons for this interest. Firstly, the main channel by which integration enhances efficiency and competitiveness are decisions of firms regarding their optimal size and location, without the former national boundaries. The utilisation of scale economies and a deeper division of labour were expected to become the driving forces of Europe's increased competitiveness in the Single Market Program. On a theoretical level, integration is modelled as a decrease in transport costs (including proper transport costs, distribution cost, transaction costs etc.). The deepening of integration needs structural changes generating the increase of specialisation. High wage countries have to move into productivity and research intensive industries on order to ensure further growth in production and employment. Low wage countries specialise in labour intensive activities. Secondly, the specialisation of countries in narrow product groups may increase demand risk for individual countries and possibly making countries and regions more vulnerable to "asymmetric shocks". These disturbances would endanger stability within a common currency area. The heterogeneity of countries

within European Union is still large, productivity increases were expected to come from increasing economies of scale and globalisation was expected to affect low-income country specifically. The contribution of economic structure allows a detailed assessment of the probable impact of these facts.

Krugman (1991) is considered a starting point of the literature on regional concentration. He measured regional concentration by calculating a locational Gini coefficient and compared the regional market shares for one industry with the employment structure of manufacturing.

Karsten (1996) develops the idea of an inverted u-shaped relation between economic concentration and per capita GNP. He delivered evidence that the share of the population in the capital city and in urban areas are largest for middle income countries and explained the more dispersed structure of Europe vs. developing countries by dispersion of the skills and the historical fact of dispersed production at the start of the industrial revolution.

Concentration was defined in relation with agglomeration in several studies. For example, according to Brülhart (1998) the concentration analyzes the location in the space of some defined well sectors (for example, industrial activities), while agglomeration analyzes the spatial location of a bigger part of economic activity as manufacturing in general. In other words, when empirical studies prove the existence of the agglomeration there is also some concentration. On the other hand, he can have some geographical concentration without agglomeration. For Hallet (2000) the concentration and the agglomeration are very different from the specialisation.

Rossi-Hansberg (2005) proposed a model with two industries, a continuum of regions, iceberg type transport costs and agglomeration effects via production externalities and demonstrated the implications that specialisation and concentration do go in opposite directions when transport costs changes. Lower transport costs imply higher specialisation and lower concentration.

Earlier theoretical and empirical studies assumed that specialisation and concentration are closely related or even equivalent phenomena. Aiginger and Rossi-Hansberg (2006) argued that they are not, and that understanding the differences between them is important to enhance our understanding of the distribution of economic activity in space.

3. Conceptual considerations on European globalisation and study assumptions

The present paper is concentrated on the phenomenon of economic concentration and its consequences in the contemporary process of globalization, with focus on the European economy. Therefore, we investigate the main theoretical approaches related to globalisation, European integration and economic concentration.

According to Friedman (2001), globalisation is "the expression of a world's system integrating itself on a highest level and permanently open to integration".

Economic globalisation is the process of increasing economic integration between countries, leading to the emergence of a global marketplace or a single world market (Riley, 2005).

The process of globalisation is associated with *internationalisation* (a growth of international exchange, large and growing flows of trade and capital investment between countries), *liberalisation* (a process of removing state-imposing restrictions on movements between countries in order to create an open borderless world economy), *universalisation* (spreading various objects and experiences to people at all corners of the earth), *modernisation* (social structures of modernity-capitalism, rationalism, industrialism, bureaucratism and individualism - are spread the world over) and *respatialisation* (a reconfiguration of social geography with increased transplanetary connection between people)(Schulte, 2008).

The complex phenoment of globalisation has several features: interconnection between regional and national economies, as result of their trade with goods and services accross border, intense cross-border trade and capital flows, a process of market integration, emergence of institutions which regulate the cross-border economic exchange, cross-border interaction of a political and social nature (Pfister, 2012).

We have two starting points in our considerations to develop a possible theory of European globalisation.

One starting point in our considerations is the assumption that *European integration is an advanced approximation of globalization* (Dinu, 2004; Dinu et al., 2005). According to Professor Marin Dinu (2004), in an interpretative model, *the globalization is a problem of progressive integration of national economies aiming to create a coherent world economy*.

This opinion is in line with assertions of other authors. European integration is, at the same time a reaction to the process of globalization and its most advanced expression (Castells, 2000). The second part of the assertion suggests that the EU can be treated as an instance of globalization. *The EU - wheather conceived as a form of liberal market order or as hybrid form of multi-level polity- is a realisation of globalisation* (Rosamond, 2005).

This asertion is consistent with Ross's observation that "the unintended consequences of decision to deepen European integration after 1985 have promoted globalisation". The key decisions in the EU's history sponsoring globalization (creation of the singke-market programm in 1985) were caused less by globalisation the strategic choices to accelerate integration.

European integration can be seen as distinct west European effort to contain the consequences of globalisation. Rather than be forced to choose between national polity

for developing policies and the relative anarchy of globe, west Europeans invented a form of regional governance with polity-like features to extend the state and harden the boundary between themselves and the rest of the world (Wallace, 1996, p.17)

An European model of globalization has fourth key points (Dinu et al, 2005):

1. acceptance of liberalism principles in economies;
2. increase of transparency of European institutions;
3. harmonisation of trade globalization, aiming to reduce poverty;
4. protection of certain branches: agriculture, public health, natural resources, cultural diversity.

In the terms of European Commission, this model means a third way to globalization, a middle way, between protectionism and uncontrolled openness of economies. The EU appears as an effective arena of globalisation under so named phenomenon of "europenisation" and as a space of individual acts of Member States, in accordance with the global trends (Dinu et.al, 2005).

Another starting point is the idea assumed by Săvoiu, Simăn and Crăciuneanu (2012), according to which, globalization is defined *as the most intense economic phenomenon of concentration of national macroeconomies. However, this also triggers the question regarding the parallel dynamics of two layers (global and national, national and regional, regional and local), and by generalization, of all structures interpreted and correlated as layers, two by two in a successive manner.*

According to the above considerations and in order to generate a simple frame for a statistical analysis, we assume that European economy is a globalized and stratified one, which integrates one by one, successive economic layers: local with regional, regional with national, national with European. The European layer integrates the national layers, a national layer (i.e. economy of a Member State) integrates its regional layers (economies of regions) and a regional layer integrates its local components (economies of local administrative territorial units).

In this vision, the phenomenon economic concentration is measured in each layer, based on the economic structure of the territorial units from the lower layer.

The assumption of the study is an increase in economic concentration from lower to higher layer.

4. Measurements for economic concentration

The concentration of an economy sector is measured by the localities, regions and countries' shares in its overall output. A given sector has a strong concentration if an important share of its output comes from few countries and regions (Aiginger, 1999; WIFO, 1999; Longhi et al., 2005).

For the purpose of the paper, we define economic concentration as the distributions of the shares of a territorial unit j in an individual industry i . Based on the hierarchical system dividing the European territory, Nomenclature of Territorial Units for Statistics (NUTS), we refer to the following territorial units: local (NUTS 3), regional (NUTS 2) and national (NUTS 0).

There are many standard statistical indices of economic concentration (dispersion) which might be used for the concept of concentration. In the statistical analysis of concentration, to the chronological data series of moments, structures of the local, regional, national and global economies are assigned specific structural energies (g_i^2). For example, the Hirschman index in the simplified form is calculated by the squared shares of industries or countries (Săvoiu et al., 2012).

$$H = \sqrt{\sum_{i=1}^n g_i^2} \quad (1)$$

where: g_i is the share of an industry or a country in the overall output and n is the number of industries or countries.

Another instrument is the Gini-Struck index (Săvoiu et al., 2012):

$$G_S = \sqrt{\frac{n \sum_{i=1}^n g_i^2 - 1}{n - 1}} \quad (2)$$

Other statistical indicators appropriate for the analysis of economic concentration are: *concentration ratio* and *standard deviation*.

Concentration ratio calculates the share of the largest n units in the total. It is easy to calculate and interpret, but as disadvantage, it makes use only of the information provided by the largest units, that the relative size of each unit within the group of large units is not accounted for, and that there is no good guide as to how n should be.

Standard deviation of the shares takes into account all available information, highly weighting positive and negative outliers. In the literature on the convergence of income, it is one of the most commonly used indicators. Sigma-convergence is reported if the standard deviation of per capita income or between productivity falls.

A special category of statistical measurement of concentration consists of *entropy indexes*. They have been long applied to income data only. But they were also used by Aiginger and Pfaffermayr (2004) in analysing the geographic concentration of several sectors at the level of European countries. Brühlhart and Traeger (2005)'s study is also based on entropy indexes.

5. Data and methodology

For the purpose of the paper, we choose the entropy index of concentration because it uses a complete distribution of industry or country shares, not only the top entities.

We imagine the European economy as global economy consisting of several layers:

Layer 0 -European level;

Layer 1 -national level;

Layer 2 -regional level;

Layer 3 -local level.

In the structure of each layer i industries and j economies are included.

We use the following notations:

In each layer, X_{ij} -the output of industry i in the economy of a territorial unit j , $i=1,...,n$ and $j=1,...,k$.

$\sum_i X_{ij} = X_j$ -the total output of all industries in the economy of the territorial unit j

$\sum_j X_{ij} = X_i$ -the total output of economy of the territorial unit j , in industry i

For a given layer, for the industry i , the entropy index of concentration is calculated by:

$$CONC_i = -\sum_j \frac{X_{ij}}{X_i} \ln \frac{X_{ij}}{X_i} \quad (3) \quad (\text{Aiginger, 2004})$$

The value of $CONC$ must lie between $\ln(k)$ and 0.

For a given layer, the entropy index of concentration is calculated by weighting $CONC_i$ with the share of industry i in the aggregate output of the layer (X):

$$E_CONC = \sum_i \frac{X_i}{X} \cdot CONC_i = -\sum_i \frac{X_i}{X} \cdot \sum_j \frac{X_{ij}}{X_i} \ln \frac{X_{ij}}{X_i} = -\sum_i \sum_j \frac{X_{ij}}{X} \ln \frac{X_{ij}}{X_i} \quad (3)$$

We will calculate E_CONC for each layer: local, regional, national and European, considering that: the economy of region is built on the economies of the local territorial units, further, the economy of a State integrates the economies of its regions, and the European economy integrates the economies of its Member States.

At European level, we include all Member States, taking into account the economic structure of 12 branches according to NACE (REV.2) and the available data in EUROSTAT database. At national level, of Member States, we calculate E_CONC based on the regional economies and their structure of 12 branches. At regional level, the

calculus was similarly, based on local economies (components of regional economies) and their structure of 12 branches.

For the output of branches and economies (at local, regional, national and European level) the values of the statistical indicator "Gross Added Value"(GVA) at market prices in Euro were used, extracted from EUROSTAT's REGIO data base, by NACE (rev.2) in the EU countries, at European level at NUTS 2 and NUTS 3 level, for the year 2011. Cipru, Malta and Luxembourg were excluded as they don't include regions (NUTS 2). Data from 270 territorial unit at NUTS 2 level and 1294 units at NUTS 3 level were computed.

6. Main findings

The entropy indexes of concentration were calculated, taking into consideration the economic layers two by two, as follows: in the layer 2, at NUTS 2 level, based on GVA of economic structures of territorial units NUTS 3; in the layer 1, at national level, based on GVA of economic structures of territorial units.

In the first column are displayed the values of entropy index of concentration in certain regions of Europe (NUTS 2), in the second column, the values for Member States and in the third column the value for the European Union.

As it is displayed in the Table 1, we notice that for the most European countries the entropy index of concentration has increasing values going from lower layers (regional) to higher layers (national and European).

From the regional to national level, respectively from layer 2 to layer 1, the concentration of economic activities is increasing for 14 EU countries of 19. For Germany, Ireland, Portugal, Slovenia and Finland the assumption that the concentration growth is related to the level of layer is not confirmed. Each country is an individual case. For the case of Germany, structured in 38 regional economies, data were available only for 3 branches: agriculture, industry and construction, therefore we appreciate the result to be not relevant for our study. In Ireland, only 2 regions are shaping the structure of the economy, very different as economic power. The GVA of is 4.64 times higher than those of Border, Midland and Western. Industry and Manufacturing are predominant in Southern and Eastern region and Industry and Trade are specific for Border, Midland and Western. The economy of Portugal is based on 8 regional units (NUTS 2), very different as concentration. For example, in Centro Region the value of entropy index is 2.15 and in Alentejo is only 1.15. Slovenia's economy is based on 2 regional economies, with almost same predominant branches: Industry and Wholesale and retail trade. In the region of Vzhodna Slovenija with 8 territorial units (NUTS 3) the entropy index is 1.78, and in Zahodna Slovenija region with 4 territorial units (NUTS 3) the entropy index is only 0.9.

Finland has 5 regions, very different as development. The GVA in Helsinki-Uusimaa regions is twice as in Länsi-Suomi, Etelä-Suomi, Pohjois- ja Itä-Suomi and of 61 times higher as in Åland.

Table 1. *Entropy index of concentration across the European Union (2011)*

Regional level (layer 2)		National level (layer 1)		European level (layer 0)
Hainaut (BE)	1,67	Belgium	2,10	2,2
Severozapaden (BG)	1,46	Bulgaria	1,46	
Severovýchod (CZ)	1,28	Czech Republic	1,94	
Hovedstaden (DK)	1,01	Denmark	1,48	
Oberbayern (DE)	2,45	Germany	1,09	
-	-	Estonia	1,11	
Southern and Eastern	1,25	Ireland	0,45	
Kentriki Makedonia (EL)	1,2	Greece	1,80	
Cataluna	0,88	Spain	2,39	
Ile de France	1,79	France	2,62	
Toscana	2,06	Italy	2,49	
-	-	Latvia	1,39	
-	-	Lithuania	1,8	
Dél-Dunántúl (HU)	1,06	Hungary	1,51	
Groningen (NL)	0,48	Netherlands	2,14	
-	-	Austria	3,22	
-	-	Poland	2,53	
Centro (PT)	2,15	Portugal	1,43	
Nord Vest (RO)	1,62	Romania	1,94	
Vzhodna Slovenija	1,78	Slovenia	0,64	
Západné Slovensko	1,08	Slovakia	1,33	
Pohjois-ja Itä Suomi	1,76	Finland	1,32	
Ostra Mellansverige	1,55	Sweden	1,82	
Eastern Scotland	1,62	United Kingdom	3,18	

Note: Malta, Cyprus were excluded as they are not structured in regional economies. Estonia, Latvia and Lithuania have only NUTS 3 territorial units. For Austria and Poland data were available only for 4, respectively 3 economic branches.

Source: author's computations based on Eurostat data.

From national to European community level, respectively from layer 1 to layer 0, the concentration increases in 18 EU countries and in 6 countries concentration is not related to the level of layer. This is the case of Spain, France, Italy, Austria, Poland and United Kingdom. In these countries the entropy index of economic concentration has higher values as the European level. Austria registered the highest level of 3,22 of the whole EU, but this result is not relevant due to the fact that data on GVA were available only for 4 branches of 12. A special case is United Kingdom which recorded a high value of 3.18 comparing with 2.2 at European level. The economy of UK is based on 37 regional economies (NUTS 2 level). The Gini coefficient illustrating the concentration of GVA between the 37 regions has the value of 0.15 showing a low concentration. Higher values of GVA are registered in the following branches: Industry and Wholesale and retail trade, transport, accommodation and food services. Industry is located in Gloucestershire, Wiltshire and Bristol/Bath area, East Anglia and West Midlands, Derbyshire and Nottinghamshire and West Yorkshire and trade in Greater Manchester,

Inner and Outer London, Berkshire, Buckinghamshire and Oxfordshire, Surrey, East and West Sussex and Gloucestershire, Wiltshire and Bristol/Bath area. Countries as Spain, Italy, France and Poland have a higher number of regions (19 in Spain, 26 in France, 22 in Italy, 16 in Poland). The entropy index of economic concentration in these countries has higher values due to the fragmentation of their economies in a higher number of territorial units.

7. Conclusions

The paper documents a process of increasing of economic concentration from bottom (local level) to top (over-national, European level) through the values of the entropy index of concentration, calculated for each layer.

We found that there is a direct relationship between the number of regional structures composing the national economies and the economic concentration at national level. As the number of regions is higher, the level of concentration is higher.

The paper intended to verify the above exposed theory of economic stratification according to which the level of economic concentration increases from a lower to a higher layer. In 6 cases of 24, the theory is not illustrated or in 6 cases the assumption of the study is not confirmed. There is an explanation of this fact. The more developed countries are tempted to attract very successful industries. More the countries are going to have similar levels of wealth; the more concentration is going to be weak. On the other hand, important differences of economic output, and that is the case of European Union, are going to determine a greater concentration of economic activities.

We found also that, as the number of the regional structures composing the national economies increases, the concentration at national level increases as well.

On the other hand, the paper offers an answer to the question: "do economic structures converge in the EU?" The answer is: mainly, yes. The findings of the paper suggest that the economic structures are more geographically concentrated going from small to vast territorial units.

This conclusion is relevant for European policy makers, since integration and globalisation are currently reshaping the industrial structures and the question that it is done in a balanced or asymmetric way remains an important policy issue (Aiginger, 1999).

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The factors that affect on foreign direct investments in Turkey (sectoral comparisons)

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Abstract. *This study focused on the concept of foreign direct investment (FDI) and examined economic, political, and investment climate-related factors influential on foreign direct investment decisions. To this end, what could be done to increase foreign direct investments on a sectorial basis was investigated through examining the factors influential on foreign direct investments in general and on a sectorial basis. In this context, analyses were made by using the annual data from the 1995 to 2012 period. The variables thought to be capable of influencing foreign direct investments in general and/or on a sectorial basis were classified, thereby creating 4 different regression models. Based on the regression analyses made, it can be said that not the same economic effects prevail in the sectors receiving foreign direct investment in Turkey, and political stability is influential on foreign direct investment, contrary to expectations.*

Keywords: Unit Root, Sectoral Foreign Direct Investments, Economic and Political Factors.

JEL Classification: C13, C33, P33.

1. Introduction

This study mainly aimed at determining the factors influential on foreign direct investments (FDIs) in Turkey and revealing whether such factors varied by sectors⁽¹⁾. Foreign direct investment reflects a company's lasting interest in a particular country, possession of a domestic enterprise belonging to such country, and the importance it attaches to such country (UNCTAD, 1999). One of the important characteristics that distinguish foreign direct investment from other investment types is lasting interest. That refers to a long-term commitment between an investor and the investment he makes. Emir and Kurtaran (2005) defines foreign direct investments as follows: a company extends its production to other countries from the country where it is headquartered and sets up a new company alone or together with partners there or acquires an existing domestic company and makes such company affiliated to it. According to Karluk (1984), foreign direct investments are the investments that are made by companies located in a country in companies situated in another country through acquiring a company there or providing founding capital for a newly founded company or increasing the capital of an existing company and that bring along technology, business administration knowledge, and investor's power of control.

One of the most important effects of foreign direct investments is its impact on the economic growth of the host company. Naturally, this effect is more important for developing countries. This is because; foreign direct investments increase economic development and growth. In addition, as an investment or acquisition takes place, an increase occurs in the equity of the host company, and the existing resources are used more efficiently (Moosa, 2002). When the ratio of foreign direct investment increases, it may keep economy under control through seizing main sectors, thereby disrupting economic integrity. That may endanger the economic and political independence of the country. This is because; "it may cause a failure in following an independent industrialization policy as a result of elimination of freedom of implementing monetary, fiscal, and foreign trade policies for specific purposes" (Seyidoğlu, 2001).

Foreign direct investments & technology is one of the important and critical matters of debate in the foreign direct investment literature. This is because; technology transfer has been one of the predominant matters within the context of multinational companies and the contributions of such companies to developing countries. It is believed that technology is a vital resource for economic growth, accumulation of capital, trade, changes in organizational relations, the training of the current personnel, and administrative knowledge. In addition, advancement in technology contributes to accumulation of capital and productivity in the host country. The reason is the monopolistic advantage to be provided by the new technology in production and the following stages. Additionally, multinational companies and their branches can be engaged in information flow and increase externality. Some advantages of technology are the training of employees to give technical support to customers and suppliers and the conduct of administrative practices (Moosa, 2002).

Regardless of the development level of a country, one of the important problems experienced in country development or sustainable development is lack of enough accumulation of capital or lack of sustainable capital needed for sustainable growth. Therefore, capital transfer between countries has gained momentum as a result of increased interaction between countries due to globalization. According to Erdilek (2006), the following three elements need to be achieved for any country to be globalized: (a) international trade, (b) labor mobility, (c) capital movement. The degree to what the above-mentioned three elements have been achieved indicates the level of globalization of a country. The said elements support one another. Labor mobility is more difficult than the other two. In other words, international trade and capital movement are easier. Capital transfer is divided into two: foreign direct investments and financial investments. Financial investments can act more rapidly than foreign direct investments. This is because; they (financial investments) do not stay in the countries they arrive in for a long time. Financial investments and foreign direct investments are much more important for such developing countries which have not reached an adequate level of savings in terms of capital markets and industry as Turkey. According to Koyuncu and Çınar (2009), foreign trade and foreign direct investment activities increased in Turkey as a result of liberalization starting after the 1980s. Such increase gained speed especially in the 2000s.

Any company which intends to penetrate into a market outside the borders of its country has a couple of options: producing goods in its own country and exporting them; making a license agreement or being engaged in a strategic merger with a company in the country in which it is to invest; penetrating into such country through direct investment (Batmaz and Tunca, 2005). Therefore, in general, foreign direct investments may get into a country in five different ways: (a) Intercompany mergers and acquisitions; (b) Investments through privatization; (c) Affiliated company based on joint venture and full ownership; (d) Strategic mergers; and/or (e) License and authorization agreements.

Turkey received a total of 91.8 billion USD foreign direct investments between 2002 and 2011. The said period also witnessed approximately 35.6 billion USD privatization. Turkey received nearly 4.2 billion USD foreign direct investments via privatization. Turkey received no foreign direct investment via privatization in 2002, 2003, 2007, and 2010. About 3.17% of the foreign direct investments received by Turkey in 2004 (1.54 billion USD) were made via privatization; about 18.31% of the foreign direct investments received by Turkey in 2005 (8.19 billion USD) were made via privatization; about 10.24% of the foreign direct investments received by Turkey in 2006 (17.26 billion USD) were made via privatization; about 3.68% of the foreign direct investments received by Turkey in 2008 (16.57 billion USD) were made via privatization; about 3.49% of the foreign direct investments received by Turkey in 2009 (6.63 billion USD) were made via privatization; and about 0.28% of the foreign direct investments received by Turkey in 2011 (14.05 billion USD) were made via privatization.

2. Literature review

Tarı and Bıdırdı (2009) employed Johansen's multiple cointegration method to examine the 1990-2006 period in order to find the determinants of foreign direct investments in Turkey. They used gross domestic product, labor cost, inflation, and openness ratio as explanatory variables. They concluded that the foreign direct investments in Turkey were influenced by gross domestic product and openness ratio positively and were influenced by labor cost and inflation ratio negatively.

Kurtaran (2007) focused on the 1980-2006 period in order to examine the degree to what economic and political factors influenced the foreign direct investments in Turkey and the direction of such influences. He employed the multiple regression model and concluded that the most important factors influential on the movement of foreign direct investments were openness ratio, incentives, and operating conditions.

Altıntaş (2009) focused on the 1996-2007 period and examined the long-term relationship between foreign direct investment flow in Turkey and foreign trade (export and import) through the VAR method and the Granger causality test. Based on the analysis results, a positive long-term relationship was detected between foreign direct investment and export and important in single-variable models, and a positive long-term relationship was found between foreign direct investment and import in the multivariate model. In another study, the dynamic panel data analysis method was employed for the 1995-2007 period in order to determine the factors influential on foreign direct investment flows in the European Union countries. Based on the analysis results, it was realized that there was a positive and significant relationship between foreign direct investment and gross domestic product used as a market size indicator, openness ratio, and per capita consumption of electricity. In addition, it was found out that balance of payments deficit affected foreign direct investments negatively (Zeren and Ergun, 2010).

Vergil and Çeştepe (2006) employed the gravity model and time-series analysis in order to determine how the foreign direct investments received by Turkey were affected by real exchange rate, economic instability, and openness. A significant and positive relationship was found between foreign direct investments and real exchange rate and openness. It was also determined that economic instability affected foreign direct investments negatively.

Daly and Zhang (2010) examined how the foreign direct investment flow in China was affected by gross domestic product, foreign exchange rate, trading volume (export and import), and average labor cost. To this end, they tested the data covering the 1980-2009 periods through the regression method. Based on the analysis results, it was seen that the yuan affected foreign direct investment flow positively, but export and import affected it negatively. Labor cost, on the other hand, affected foreign direct investment negatively in the 1980-2008 period, but affected it positively in the 1992-2008 period (especially in terms of textile sector).

Uwubanmwun and Ajao (2012) examined foreign exchange rate, interest rate, inflation, GDP, and openness in order to determine the effects of foreign direct investments received by Nigeria in the 1970-2009 period. They employed the vector error correction model (VECM) and Granger causality analysis and determined a long-term relationship between foreign direct investments and gross domestic product. They also determined that foreign direct investment did not have a significant influence on Nigeria in terms of growth and economic development in the above-mentioned period.

Brandl, Strohmer and Traxler (2013) addressed 15 sectors and sectoral effects to examine the foreign direct investments made by the USA in the European Union countries. The study employed the time series analysis and concluded that labor cost had a restrictive effect on foreign direct investments, but market size did not have any significant effect on such investments. Furthermore, the researchers said that unionization affected foreign direct investments in textile sector negatively, and that resulted from the fact that investors wanted to keep labor costs at the lowest level for the experienced labor and at the highest level in the service sector.

Al-Sadig (2013) focused on 91 developing countries in order to investigate the effects of foreign direct investments on the host country private sector. The study analyzed the 1970-2000 period and grouped the countries by level of income. It was determined that the foreign direct investments made in countries that were rich in human resources but had low levels of income had a positive effect on private sectors.

Lamine and Yang (2010) investigated the effects of the foreign direct investments in the Republic of Guinea on economic growth. The study employed the Granger causality analysis and tested the foreign direct investments belonging to the 1987-2009 period. Based on the analysis results, it was found that the existing foreign direct investment flow had a low effect on economic growth; employment had a key role in attracting foreign direct investments; and educational level had an additive effect on economic growth and foreign direct investments.

Javed, Sial, Awan and Sher (2011) focused on the 1973-2009 period and examined how gross domestic product and foreign direct investments affected employment in Pakistan. They employed the unit root test and the cointegration test and found out that gross domestic product and foreign direct investments had positive effects on employment. However, they also determined that domestic investments influenced employment negatively in Pakistan.

Koojaroenprasit (2012) focused on the 1980-2009 period and addressed the variables of employment, human capital, and domestic investment in order to determine the economic effects of the foreign direct investments received by South Korea. The time series analysis was made in the study which concluded that foreign direct investments had a positive and strong influence on economic growth. Furthermore, it was seen that while human capital, employment, and export had a positive effect, domestic investments did not have any significant effect.

Besides the above-mentioned studies, many other studies have been conducted in relation to foreign direct investments. The frequently used variables in these studies are *gross domestic product* (Erçakır, 2004; Zeren and Ergun, 2010; Bahar, 2010; Erdal and Tatoğlu, 2002; Ayaydın, 2010; Şimşek and Behdioğlu, 2006; Açıkalin, Gül and Yaşar, 2006; Kar and Tatlısöz, 2008; Lebe and Başar, 2008; Daly and Zhang, 2010; Liu, Daly and Varua, 2012; Uwubanmwun and Ajao, 2012; Naguib, 2012; Brandal, Strohmer and Traxler, 2013; Al-sadig, 2013; Lamine and Yang, 2010; Shaori, Hong and Shuken, 2012; Javed, Sial, Awan and Sher, 2011; Hoang, Wiboanchutikula and Tubtimtong, 2010; Alavinasab, 2013; Saqib, Masnoor and Rafique, 2013; Onu, 2012), *corporate tax* (Erçakır, 2004), *bribery* (Erçakır, 2004), *energy* (Erçakır, 2004; Zeren and Ergun, 2010; Kar and Tatlısöz, 2008), *openness* (Zeren and Ergun, 2010; Vergil and Çeştepe, 2006; Erdal and Tatoğlu, 2002; Kar and Tatlısöz, 2008; Uwubanmwun and Ajao, 2012; Al-sadig, 2013; Lamine and Yang, 2010), *labor-employment* (Şimşek and Behdioğlu, 2006; Kar and Tatlısöz, 2008; Bahar, 2010; Naguib, 2012; Lamine and Yang, 2010; Javed, Sial, Awan and Sher, 2011; Hoang, Wiboanchutikula and Tubtimtong, 2010), *real exchange rate* (Bahar, 2010; Vergil and Çeştepe, 2006; Erdal and Tatoğlu, 2002; Kar and Tatlısöz, 2008; Uwubanmwun and Ajao, 2012), *instability* (Vergil and Çeştepe, 2006; Erdal and Tatoğlu, 2002), *infrastructure* (Liu, Daly and Varua, 2012; Erdal and Tatoğlu, 2002; Alavinasab, 2013), *interest rate* (Erdal and Tatoğlu, 2002; Lebe and Başar, 2008; Uwubanmwun and Ajao, 2012), *wages* (Açıkalin, Gül and Yaşar, 2006; Brandal, Strohmer and Traxler, 2013; Daly and Zhang, 2010; Liu, Daly and Varua, 2012; Brandal, Strohmer and Traxler, 2013), *investment incentives* (Kar and Tatlısöz, 2008), *foreign trade* (Daly and Zhang, 2010; Naguib, 2012; Al-sadig, 2013; Saqib, Masnoor and Rafique, 2013), *inflation* (Uwubanmwun and Ajao, 2012; Saqib, Masnoor and Rafique, 2013), *external debt* (Naguib, 2012; Saqib, Masnoor and Rafique, 2013), *unionization* (Brandal, Strohmer and Traxler, 2013). In the present study, four different models were created based on some of the above-mentioned variables.

3. Analysis and results

The analysis aimed to reveal the factors influential on the foreign direct investments in Turkey and whether or not such factors varied by sectoral foreign direct investments. To this end, the data covering the 1995-2012 period were used. The study searched the variables influential on the foreign direct investments received by 6 six sectors in Turkey between 1995 and 2012. In regard to the foreign direct investments (FDIs) received by sectors in Turkey, the following variables were used: gross domestic product(GDP), export (EXP), import (IMP), bribery and corruption index (BCI), political stability dummy variable (PS), wages (W), infrastructure expenses (INFRA), corporate tax (CT), real effective foreign exchange rate (FER), inflation (INF), and interest (INT). Table 1 demonstrates the channels from which the dataset related to the above-mentioned variables was obtained.

Table 1. *Data sources*

Variable	Data Source
Foreign direct investments (By sectors)	Organisation for Economic Cooperation and Development (OECD) http://stats.oecd.org
Gross domestic product	Central Bank of the Republic of Turkey (CBRT) http://evds.tcmb.gov.tr/cbt.html
Import	Turkish Statistical Institute (TURKSTAT) http://tuikapp.tuik.gov.tr/disticaretapp/menu.zul
Export	Turkish Statistical Institute (TURKSTAT) http://tuikapp.tuik.gov.tr/disticaretapp/menu.zul
Real effective foreign exchange rate	Central Bank of the Republic of Turkey (CBRT) http://evds.tcmb.gov.tr/cbt.html
Bribery and corruption index	Transparency International (TI) http://www.transparency.org/country
Infrastructure expenses	International Transport Forum (ITF) http://stats.oecd.org
Inflation	Central Bank of the Republic of Turkey (CBRT) http://evds.tcmb.gov.tr/cbt.html
Interest rates	Central Bank of the Republic of Turkey (CBRT) http://evds.tcmb.gov.tr/cbt.html
Corporate tax	Organisation for Economic Cooperation and Development (OECD) http://stats.oecd.org
Wages	Turkish Statistical Institute (TURKSTAT) http://tuikapp.tuik.gov.tr/sanayidagitimapp/istihdamWet.zul

3.1. Regression models

For the regression analysis, foreign direct investments were taken as the dependent variable while other variables were taken as independent variables. 4 different regression models were created by grouping independent variables in different ways. Thus, the first model employed the variables of gross domestic product, export, import, bribery and corruption index, and political stability:

$$\ln(FDI)_t = \alpha_0 + \alpha_1 \ln(GDP)_t + \alpha_2 \ln(EXP)_t + \alpha_3 \ln(IMP)_t + \alpha_4 PS_t + \alpha_5 BCI_t + \varepsilon_{1t}$$

Model (2) was created by adding wages, infrastructure expenses, and corporate tax to the Model (1).

$$\ln(FDI)_t = \beta_0 + \beta_1 \ln(GDP)_t + \beta_2 \ln(EXP)_t + \beta_3 \ln(IMP)_t + \beta_4 PS_t + \beta_5 BCI_t + \beta_6 W_t + \beta_7 \ln(INFRA)_t + \beta_8 \ln(CT)_t + \varepsilon_{2t}$$

Model (3) was created by adding real effective foreign exchange rate, inflation rate, and interest rates on deposits to the Model (1).

$$\ln(FDI)_t = \gamma_0 + \gamma_1 \ln(GDP)_t + \gamma_2 \ln(EXP)_t + \gamma_3 \ln(IMP)_t + \gamma_4 PS_t + \gamma_5 BCI_t + \gamma_6 FER_t + \gamma_7 \ln(INF)_t + \gamma_8 \ln(INT)_t + \varepsilon_{3t}$$

Finally, Model (4) was created by adding all the independent variables.

$$\begin{aligned} \ln(FDI)_t = & \xi_0 + \xi_1 \ln(GDP)_t + \xi_2 \ln(EXP)_t + \xi_3 \ln(IMP)_t + \xi_4 PS_t + \xi_5 BCI_t + \xi_6 W_t \\ & + \xi_7 \ln(INFRA)_t + \xi_8 \ln(CT)_t + \xi_9 FER_t + \xi_{10} \ln(INF)_t \\ & + \xi_{11} \ln(INT)_t + \varepsilon_{4t} \end{aligned}$$

Every model was analyzed separately for the sectorial distribution of foreign direct investments and for total foreign direct investments received by Turkey. The first variable that may affect foreign direct investment flows is gross domestic product, which shows the economic size of a country. A steadily increasing gross domestic product indicates the economic stability and market potential of a country. Since those who invest in a growing economy are likely to produce income thanks to such growth, a positive investment expectation arises in regard to this variable (Kar and Tatlısöz, 2008). Another variable is real effective foreign exchange rate. It has been reported in many studies that real effective foreign exchange rate is a critical determinant for foreign direct investments. It is stated that foreign investors are less likely to invest in the countries that are weak in terms of foreign exchange rate. Thus, a negative investment expectation arises in regard to this variable (Chakrabarti, 2001).

Another independent variable is inflation. Rise in inflation in a country indicates that macroeconomic stability has been disrupted, and government fails or acts unwillingly to control the balance of payments and regulate the money supply. Therefore, a negative investment expectation arises in regard to this variable (Çeştepe and Mıstaçoğlu, 2010). Bribery and corruption is another variable under examination. The higher the bribery and corruption coefficient is, the more likely it is for the host country to receive foreign direct investments. The lower the bribery and corruption coefficient is, the less likely it is for the host country to receive foreign direct investments. For that reason, a negative investment expectation arises in regard to this variable. The ratio of corporate tax in gross domestic product has been addressed as an independent variable, too. The higher the corporate tax ratio in the host country is, the less likely it is for the host country to receive foreign direct investments. In brief, high corporate tax ratio has an inhibiting effect on foreign direct investments. Therefore, a negative investment expectation arises in regard to this variable (Erçakar, 2004).

Another variable focused on as an independent variable is infrastructure expenses and transport costs. Infrastructure is an important determinant for foreign direct investments. The countries with good infrastructure conditions attract more foreign direct investments in comparison to others. Thus, a positive investment expectation arises in regard to this variable (Berköz and Türk, 2007). The seventh independent variable is labor wages. In the present study, minimum wage was taken as indication for this variable. Labor costs are very important for export-based establishments and foreign direct investments in labor-intensive industries. Companies engaged in labor-intensive production are more likely to make investment in the regions where labor is low-cost in order to make higher profit. Thus, a positive investment expectation arises in regard to this variable (Kurtaran, 2007).

Interest rates were also treated as an independent variable in the present study. Rise in interest rates makes private sector investments more expensive and thus reduces them. Accordingly, economic growth is affected negatively. Moreover, increase in interest rates influences decisions about foreign direct investments negatively for the host country (Lebe and Başar, 2008). Import and export values were among the independent variables of the study, too. The literature shows that these two variables are important determinants for foreign direct investments. In general, high import and export values indicate export potential and the existence of a dynamic and sound economy and make the host country attractive for foreign direct investments (Chakrabarti, 2001).

Whether foreign direct investments are made through building new facilities from scratch or are made through acquisitions, they are directly affected by the political stability of the host country. Since multinational companies believe that they may make higher profit in countries with a high political stability, they will increase their investments in such countries. When the foreign direct investments received by such countries increase, the prices of the products manufactured in these countries will fall, thereby leading to a more competitive environment both in the domestic market of the host country and in the international markets. Thus, more foreign direct investments will be received by the host country. In this sense, a positive investment expectation arises in regard to this variable (Chakrabarti, 2003).

3.2. Unit root analysis and findings

The test of stationarity was administered to the variables. In this way, non-stationary variables were made stationary. Then regression analyses were made in order to determine the factors influential on foreign direct investments. For the stationarity test, the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (P-P) methods were used.

For the time series analyses, whether or not the variables were stationary was tested in the first place. To this end, the Augmented Dickey-Fuller unit root test was conducted for each variable. It was found out that the level values of the variables involved unit root for trend and non-trend models. Thus, to make the variables stationary, the first differences of time series were taken, and the series were subjected to the test of stationarity. It was determined that some variables were stationary in the first differences (Table 2). Besides the ADF unit root test, the Phillips-Perron unit root test was conducted in order to correct and make stationary the error terms of the series. The results are given in Table 3. The Phillips-Perron test, which does not include restrictive assumptions in the matter of error terms and has been developed to control high-degree correlation, is a unit root test that complements the Augmented Dickey-Fuller test. In the Phillips-Perron test, the delayed values of dependent variables enough for eliminating autocorrelation are not included in the model. Instead, the model is adapted with the Newey-West estimator. In this test, the series is considered stationary when the test statistic (in absolute value) is bigger than the critical values tabulated by MacKinnon (Mucuk and Demirsel, 2009).

Table 2. *The results of the Augmented Dickey-Fuller stationary analysis for level values*

Variables	Level Values I(0)		First Difference Values I(1)	
	Non-Trend Model	Trend Model	Non-Trend Model	Trend Model
	t-statistic	t-statistic	t-statistic	t-statistic
ln(AM)	-0.670	-2.010	-1.688	-1.705
ln(MFG)	-0.788	-2.509	-2.918	-2.836
ln(WRT)	-2.161	-2.201	-1.941	-1.871
ln(TCS)	-1.848	-1.495	-2.563	-2.258
ln(FIREA)	-0.802	-2.134	-2.041	-1.936
ln(OS)	-1.043	-3.499	-3.556	-3.307
ln(TFI)	-1.020	-1.949	-2.502	-2.401
ln(GDP)	0.225	-2.854	-2.448	-2.406
FER	-2.698	-2.683	-1.756	-1.627
ln(INF)	-0.728	-1.627	-2.116	-2.084
BCI	-0.228	-1.279	-2.975	-4.694
ln(CT)	-1.165	-1.826	-1.472	-1.083
W	-1.162	-2.263	-2.580	-2.588
ln(INFRA)	-0.463	-2.517	-2.060	-1.951
ln(IMP)	0.013	-2.249	-1.925	-1.856
ln(EXP)	-0.170	-2.255	-1.803	-1.698
ln(INT)	0.671	-2.316	-4.030	-4.585

Note: For the non-trend model, t-values were taken as -3.750, -3.000, and -2.630 for the significance levels of 1%, 5%, and 10% respectively. For the trend-model, t-values were taken as 4.380, -3.600, and -3.240 for the significance levels of 1%, 5%, and 10% respectively.

According to these results, FER did not include unit root at 10% level in the non-trend model and was stationary. In addition, it was determined that OS did not include unit root at 5% level in the trend model and was stationary. According to the results of the stationarity analysis made for the first differences, MFG, OS, BCI, and INTEREST did not include unit root at 10%, 5%, 10%, and 1% levels respectively in the non-trend model and were stationary. In the trend model, BCI and INTEREST did not include unit root at 1% level in the first differences and were stationary. On the other hand, it was observed that other variables included unit root in the first differences and were non-stationary. Since the results were not consistent with the assumptions of the Augmented Dickey-Fuller unit root test, the Phillips-Perron unit root test was conducted for level values in order to correct the error terms of the series. The results are summarized in Table 3.

Table 3. *The results of the Phillips-Perron stationary analysis for level values*

Variables	Level Values I(0)		First Difference Values I(1)	
	Non-Trend Model	Trend Model	Non-Trend Model	Trend Model
	t-statistic	t-statistic	t-statistic	t-statistic
ln(AM)	-1.234	-1.918	-4.055	-3.926
ln(MFG)	-1.088	-2.696	-4.594	-4.500
ln(WRT)	-2.844	-2.822	-6.343	-6.190
ln(TCS)	-2.232	-2.598	-4.789	-4.835
ln(FIREA)	-1.353	-2.444	-5.358	-5.157
ln(OS)	-0.987	-4.122	-6.816	-6.345
ln(TFI)	-1.135	-2.260	-3.216	-3.059
ln(GDP)	-0.308	-2.171	-3.874	-3.770
FER	-3.071	-2.916	-5.876	-5.887
ln(INF)	-0.730	-1.838	-3.193	-3.024
BCI	-0.812	-2.361	-2.692	-2.884
ln(CT)	-3.380	-2.951	-3.862	-3.934
W	-1.725	-2.843	-5.829	-5.629
ln(INFRA)	-0.802	-2.073	-4.687	-4.527
ln(IMP)	-0.326	-2.119	-4.499	-4.408
ln(EXP)	-0.103	-1.904	-3.162	-3.047
ln(INT)	-0.386	-2.256	-4.469	-4.402

Note: For the non-trend model, t-values were taken as -3.750, -3.000, and -2.630 for the significance levels of 1%, 5%, and 10% respectively. For the trend-model, t-values were taken as 4.380, -3.600, and -3.240 for the significance levels of 1%, 5%, and 10% respectively.

According to the results in the Table 3, in the non-trend model, WRT, FER, and CT did not include unit root at 10%, 5%, and 5% levels respectively and were stationary. In the trend model, OS did not include unit root at 5% level and was stationary. According to the results of the analysis made for the first differences, in the non-trend model, INF, EXP, and TFI did not include unit root at 5% level in the first differences; BCI did not include unit root at 10% level in the first differences; all other variables did not include unit root at 1% level in the first differences; and all such variables were stationary. On the other hand, in the trend model, TFI, INF, BCI, and EXP were found to be non-stationary. In addition, it was found that AM, GDP, and CT did not include unit root at 5% level and were stationary. All other variables were detected to be stationary at 1% level.

3.3. Regression analysis results

Regression analysis was made in order to reveal the factors influential on foreign direct investments in each sub-sector through four different models. Errors of estimation must not involve autocorrelation; variances must be equal; variables must be suitable for normal distribution; and there must be no multicollinearity between independent variables so that the models created in regression analyses yield meaningful results. Whether or not the variables had a normal distribution was checked. Based on the results, the natural logarithms of the variables not having normal distribution were taken, and they were

transformed. The variance inflation factor (VIF) was used for testing the multicollinearity problem and supporting the results of the regression models. Another method employed in determining the multicollinearity problem is the tolerance ($1/VIF$) values of variables (Doğan, 2013). High VIF values are considered to indicate that the model is problematic or independent variables have multicollinearity. Although there is no firm consensus regarding the required exact VIF value or the highest VIF value allowing variables to be included in the model, it is generally thought that there is no multicollinearity problem in a model if $VIF < 10$. The removal of an independent variable or variables with a VIF value higher than 10 from the model may make the statistically insignificant results of the original model significant (Gujarati, 2004). Since the VIF value of the variable of import (IMP) was higher than 10 in the entire sample in the Model (4) according to the results of the regression analyses conducted, it was removed from the model.

According to the Model (1) results, gross domestic product had a significant and positive effect on total foreign direct investments at 5% significance level ($t=3.07$, $p<0.05$). In addition, while export had a significant and positive effect at 5% significance level ($t=2.68$, $p<0.05$), import had a significant but negative effect at 5% significance level ($t=-2.73$, $p<0.05$). According to the Model (2) results, gross domestic product had a significant and positive effect at 1% significance level ($t=5.08$, $p<0.01$). Export had a significant and positive effect at 5% significance level ($t=2.99$, $p<0.05$). Moreover, wages had a significant but negative effect at 5% significance level ($t=-2.47$, $p<0.05$), and infrastructure had a significant but negative effect at 5% significance level ($t=-2.49$, $p<0.05$).

Table 4. Regression analysis results for the total foreign direct investments received by Turkey.

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient (t-statistic)	VIF	Coefficient (t-statistic)	VIF	Coefficient (t-statistic)	VIF	Coefficient (t-statistic)	VIF
$\Delta \ln(\text{GDP})$	12.31(3.07)**	3.26	16.02(5.08)*	3.69	11.02(2.43)**	3.97	12.21(3.48)**	3.82
$\Delta \ln(\text{IMP})$	-4.306(-2.73)**	5.44	-2.153(-1.52)	8.06	-2.799(-1.48)	7.47		
$\Delta \ln(\text{EXP})$	4.697(2.68)**	2.49	5.821(2.99)**	5.63	2.878(1.30)	3.82	3.558(1.83)	4.73
PS	-0.329(-1.05)	1.24	-0.448(-1.46)	2.14	1-0.533(-1.49)	1.52	-0.946(-2.43)***	2.91
ΔBCI	-0.0180(-0.37)	1.35	0.0311(0.81)	1.59	0.0417(0.67)	2.15	0.0859(2.09)***	1.51
ΔW	-		-0.00499(-2.47)**	3.20	-		-0.00434(-1.74)	4.05
$\Delta \ln(\text{INFRA})$	-		-0.879(-2.49)**	4.69	-		-0.895(-2.31)***	4.74
$\Delta \ln(\text{CT})$	-		2.421(0.81)	2.29	-		-2.871(-0.69)	3.75
ΔFER	-		-		-0.0190(-1.21)	2.30	-0.0182(-1.18)	3.62
$\Delta \ln(\text{INF})$	-		-		0.117(0.25)	1.13	0.409(1.02)	1.35
$\Delta \ln(\text{INT})$	-		-		-0.387(-1.13)	1.28	-0.452(-1.27)	2.21
Constant	-0.546(-1.69)		-0.856(-2.40)**		-0.333(-0.92)		-0.115(-0.25)	
R ² value	0.581		0.834		0.682		0.851	
Adjusted R ²	0.390		0.668		0.364		0.603	
AIC	32.99		23.26		34.30		25.38	
BIC	37.99		30.76		41.80		34.54	
F-Value	3.050		5.018		2.144		3.434	

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively.

According to the Model (3) results, gross domestic product had a significant and positive effect at 5% significance level ($t=2.43$, $p<0.05$). According to the Model (4) results, gross domestic product had a significant and positive effect at 5% significance level ($t=3.48$, $p<0.05$). In addition, political stability had a significant but negative effect at 10% significance level ($t=-2.43$, $p<0.1$), and corruption had a significant and positive effect at 10% significance level ($t=2.09$, $p<0.1$). Infrastructure, on the other hand, was found to have a significant but negative effect at 10% level ($t=-2.31$, $p<0.1$).

According to the Model (1), Model (2), Model (3), and Model (4) results, the power of the independent variables used in these models to explain foreign direct investments increased as the variables were added to the Model (1). The power of economic variables to explain foreign direct investments (R^2) was found to be 58.1% in the Model (1), 83.4% in the Model (2), 68.2% in the Model (3), and 85.1% in the Model (4). In accordance with the research results, the results of the regression analyses conducted for each sector were tabulated separately. They are given in Table 5 to Table 10.

As is seen in Table 5, the analyses made for the Agriculture and Mining sector showed that no model and no variable had any effect. That is, no factor was found to be influential on the foreign direct investments received by this sector. The investors of this sector made investments without considering the variables included in the model. They invested because of the variables not included in the model.

The results of the regression analysis made for the manufacturing sector are given in Table 6. According to the Model (1) results, export had a significant and positive effect on the foreign direct investments received by the manufacturing sector at 1% significance level ($t=3.22$, $p<0.01$). In addition, import had a significant but negative effect at 5% significance level ($t=-2.54$, $p<0.05$). On the other hand, according to the Model (2) results, export had a significant and positive effect at 5% significance level ($t=2.70$, $p<0.05$), and import had a significant but negative effect at 10% significance level ($t=-1.92$, $p<0.1$).

According to the Model (3) results, gross domestic product had a significant and positive effect at 5% significance level ($t=2.32$, $p<0.05$), and export had a significant and positive effect at 5% significance level ($t=2.39$, $p<0.05$). However, import had a significant but negative effect at 10% significance level ($t=-1.96$, $p<0.1$). Foreign exchange rate had a significant but negative effect on the foreign direct investments received by the manufacturing sector at 5% significance level ($t=-2.76$, $p<0.05$). Inflation had a significant and positive effect at 5% significance level ($t=2.38$, $p<0.05$). According to the Model (4) results, inflation had a significant and positive effect on the foreign direct investments received by the manufacturing sector at 10% significance level ($t=1.99$, $p<0.1$).

Table 5. Regression analysis results for the agriculture and mining sector.

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF
$\Delta \ln(\text{GDP})$	3.668(0.46)	3.26	-0.831(-0.10)	3.69	9.936(1.14)	3.97	1.757(0.21)	3.82
$\Delta \ln(\text{IMP})$	0.200(0.06)	5.44	-2.011(-0.52)	8.06	-0.873(-0.24)	7.47	-	-
$\Delta \ln(\text{EXP})$	0.308(0.09)	2.49	-2.297(-0.43)	5.63	0.590(0.14)	3.82	-5.634(-1.24)	4.73
PS	0.568(0.90)	1.24	0.580(0.69)	2.14	0.491(0.71)	1.52	0.356(0.39)	2.91
ΔBCI	-0.0588(-0.61)	1.35	-0.119(-1.12)	1.59	-0.109(-0.91)	2.15	-0.0803(-0.84)	1.51
ΔW	-	-	0.00493(0.89)	3.20	-	-	0.00500(0.86)	4.05
$\Delta \ln(\text{INFRA})$	-	-	1.258(1.30)	4.69	-	-	1.383(1.53)	4.74
$\Delta \ln(\text{CT})$	-	-	-5.169(-0.63)	2.29	-	-	-2.946(-0.30)	3.75
ΔFER	-	-	-	-	-0.00630(-0.21)	2.30	-0.0307(-0.85)	3.62
$\Delta \ln(\text{INF})$	-	-	-	-	-1.372(-1.53)	1.13	-1.434(-1.54)	1.35
$\Delta \ln(\text{INT})$	-	-	-	-	0.672(1.02)	1.28	0.342(0.41)	2.21
Constant	-0.474(-0.74)		0.129(0.13)		-0.865(-1.24)		-0.0176(-0.02)	
R ² value	0.186		0.388		0.423		0.605	
Adjusted R ²	-0.183		-0.223		-0.154		-0.052	
AIC	56.45		57.60		56.61		54.15	
BIC	61.45		65.10		64.11		63.32	
F-Value	0.504		0.635		0.733		0.920	

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively.

Table 6. Regression analysis results for the manufacturing sector.

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF
$\Delta \ln(\text{GDP})$	7.009(1.57)	3.26	8.622(1.85)	3.69	7.438(2.32)**	3.97	6.469(1.73)	3.82
$\Delta \ln(\text{IMP})$	-4.457(-2.54)**	5.44	-4.024(-1.92)***	8.06	-2.621(-1.96)***	7.47	-	-
$\Delta \ln(\text{EXP})$	6.265(3.22)*	2.49	7.758(2.70)**	5.63	3.755(2.39)**	3.82	3.615(1.74)	4.73
PS	-0.129(-0.37)	1.24	0.178(0.39)	2.14	-0.246(-0.97)	1.52	-0.329(-0.79)	2.91
ΔBCI	-0.0230(-0.43)	1.35	0.00854(0.15)	1.59	0.0331(0.75)	2.15	0.0776(1.77)	1.51
ΔW	-	-	-0.00116(-0.39)	3.20	-	-	-0.00244(-0.92)	4.05
$\Delta \ln(\text{INFRA})$	-	-	-0.462(-0.89)	4.69	-	-	-0.550(-1.33)	4.74
$\Delta \ln(\text{CT})$	-	-	6.829(1.55)	2.29	-	-	1.593(0.36)	3.75
ΔFER	-	-	-	-	-0.0306(-2.76)**	2.30	-0.0303(-1.83)	3.62
$\Delta \ln(\text{INF})$	-	-	-	-	0.782(2.38)**	1.13	0.850(1.99)***	1.35
$\Delta \ln(\text{INT})$	-	-	-	-	0.271(1.12)	1.28	0.310(0.82)	2.21
Constant	-0.475(-1.33)		-1.079(-2.05)***		-0.184(-0.71)		-0.198(-0.41)	
R ² value	0.510		0.656		0.849		0.839	
Adjusted R ²	0.287		0.312		0.697		0.570	
AIC	36.53		36.51		22.55		27.63	
BIC	41.53		44.01		30.05		36.80	
F-Value	2.289		1.907		5.611		3.122	

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively.

Table 7. Regression analysis results for the wholesale and retail trade sector.

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF
$\Delta \ln(\text{GDP})$	10.82(1.40)	3.26	8.531(1.62)	3.69	8.763(0.95)	3.97	4.590(1.18)	3.82
$\Delta \ln(\text{IMP})$	-3.327(-1.10)	5.44	-1.835(-0.77)	8.06	-3.732(-0.97)	7.47	-	-
$\Delta \ln(\text{EXP})$	5.114(1.52)	2.49	-5.208(-1.60)	5.63	6.094(1.35)	3.82	-6.096(-2.83)**	4.73
PS	-0.416(-0.69)	1.24	-0.959(-1.87)***	2.14	-0.170(-0.23)	1.52	-1.205(-2.80)**	2.91
ΔBCI	0.0119(0.13)	1.35	-0.00520(-0.08)	1.59	-0.00674(-0.05)	2.15	0.0237(0.52)	1.51
ΔW	-	-	-0.00554(-1.64)	3.20	-	-	-0.00672(-2.44)***	4.05
$\Delta \ln(\text{INFRA})$	-	-	2.155(3.65)*	4.69	-	-	2.001(4.67)*	4.74
$\Delta \ln(\text{CT})$	-	-	-12.43(-2.49)**	2.29	-	-	-17.65(-3.82)*	3.75
ΔFER	-	-	-	-	0.0140(0.44)	2.30	0.000753(0.04)	3.62
$\Delta \ln(\text{INF})$	-	-	-	-	1.029(1.09)	1.13	1.416(3.20)**	1.35
$\Delta \ln(\text{INT})$	-	-	-	-	0.180(0.26)	1.28	-0.114(-0.29)	2.21
Constant	-0.730(-1.18)		0.757(1.27)		-0.627(-0.85)		1.500(2.97)**	
R ² value	0.323		0.796		0.420		0.921	
Adjusted R ²	0.015		0.593		-0.159		0.788	
AIC	55.18		40.75		58.54		28.76	
BIC	60.18		48.25		66.04		37.92	
F-Value	1.048		3.911		0.725		6.950	

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively.

The results of the regression analysis made for the wholesale and retail trade sector are given in Table 7. According to the analysis results, no variable included in the Model (1) or Model (3) had any effect on the foreign direct investments received by the wholesale and retail trade sector. According to the Model (2) results, political stability had a significant but negative effect at 10% significance level ($t=-1.87$, $p<0.1$). Infrastructure had a significant and positive effect at 1% significance level ($t=3.65$, $p<0.01$). Tax, on the other hand, had a significant but negative effect at 5% significance level ($t=-2.49$, $p<0.05$).

According to the Model (4) results, export had a significant but negative effect at 5% significance level ($t=-2.83$, $p<0.05$). Moreover, political stability had a significant but negative effect at 5% significance level ($t=-2.80$, $p<0.05$). While wages had a significant but negative effect at 10% significance level ($t=-2.44$, $p<0.1$), infrastructure had a significant and positive effect at 1% significance level ($t=4.67$, $p<0.01$). Furthermore, while tax had a significant but negative effect at 1% significance level ($t=-3.82$, $p<0.01$), inflation had a significant and positive effect at 5% significance level ($t=3.20$, $p<0.05$).

The results of the regression analysis made for the transportation, communication, and storage services sector are given in Table 8. According to the analysis results, no variable included in the Model (2) had any effect on the foreign direct investments received by the transportation, communication, and storage services sector. According to the Model (1) results, gross domestic product had a significant and positive effect at 5% significance

level ($t=2.69$, $p<0.05$). In addition, export had a significant and positive effect at 5% significance level ($t=2.46$, $p<0.05$). However, import had a significant but negative effect at 5% significance level ($t=-3.24$, $p<0.05$).

According to the Model (3) results, gross domestic product had a significant and positive effect at 1% significance level ($t=10.08$, $p<0.01$). In addition, export had a significant and positive effect at 5% significance level ($t=3.00$, $p<0.05$). On the other hand, import had a significant but negative effect at 1% significance level ($t=-6.73$, $p<0.01$). Likewise, foreign exchange rate had a significant but negative effect at 1% significance level ($t=-6.90$, $p<0.01$). Inflation had a significant but negative effect at 1% significance level ($t=-8.14$, $p<0.01$), and interest had a significant but negative effect at 5% significance level ($t=-2.12$, $p<0.05$).

According to the Model (4) results, while gross domestic product had a significant and positive effect at 10% significance level ($t=2.96$, $p<0.1$), political stability had a significant but negative effect at 5% significance level ($t=-4.14$, $p<0.05$). In addition, while corruption had a significant and positive effect at 10% significance level ($t=2.54$, $p<0.1$), foreign exchange rate had a significant but negative effect at 1% significance level ($t=-6.35$, $p<0.01$). Interest had a significant but negative effect at 10% significance level ($t=-3.16$, $p<0.1$).

Table 8. Regression analysis results for the transportation, communication, and storage services sector

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF
$\Delta \ln(\text{GDP})$	62.32(2.69)**	4.39	8.931(0.34)	2.03	60.47(10.08)*	5.25	31.01(2.96)**	3.19
$\Delta \ln(\text{IMP})$	-26.25(-3.24)**	5.52	-	-	-16.55(-6.73)*	9.04	-	-
$\Delta \ln(\text{EXP})$	21.76(2.46)**	2.54	10.18(0.52)	4.51	8.639(3.00)**	4.80	-2.488(-0.38)	5.08
PS	-3.211(-1.55)	1.34	-2.208(-0.56)	1.74	-3.971(-7.97)*	1.38	-5.969(-4.14)**	2.30
ΔBCI	-0.467(-1.25)	1.61	0.0844(0.13)	1.73	-0.0694(-0.66)	2.24	0.561(2.54)**	1.99
ΔW	-	-	-	-	-	-	-	-
$\Delta \ln(\text{INFRA})$	-	-	-2.050(-0.47)	5.45	-	-	-1.728(-1.24)	5.55
$\Delta \ln(\text{CT})$	-	-	10.60(0.32)	1.61	-	-	-36.70(-2.24)	3.81
ΔFER	-	-	-	-	-0.143(-6.90)*	2.89	-0.264(-6.35)*	2.32
$\Delta \ln(\text{INF})$	-	-	-	-	-4.519(-8.14)*	1.11	-2.159(-1.41)	1.68
$\Delta \ln(\text{INT})$	-	-	-	-	-1.817(-3.47)**	1.20	-4.539(-3.16)**	1.79
Constant	-0.574(-0.32)		0.392(0.09)		-0.936(-2.12)		2.446(1.55)	
R ² value	0.643		0.149		0.989		0.957	
Adjusted R ²	0.388		-0.703		0.966		0.828	
AIC	66.91		80.21		28.18		47.41	
BIC	70.29		84.17		33.26		53.06	
F-Value	2.524		0.175		43.24		7.411	

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively.

Table 9. Regression analysis results for the financial intermediaries and real estate activities sector

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF
$\Delta \ln(\text{GDP})$	9.466(0.79)	3.26	11.82(0.95)	3.69	7.766(0.68)	3.97	14.29(1.41)	3.82
$\Delta \ln(\text{IMP})$	3.754(0.79)	5.44	5.080(0.91)	8.06	-2.136(-0.45)	7.47	-	-
$\Delta \ln(\text{EXP})$	-1.746(-0.33)	2.49	2.076(0.27)	5.63	6.605(1.17)	3.82	11.30(2.01)***	4.73
PS	0.423(0.45)	1.24	-0.676(-0.56)	2.14	1.408(1.56)	1.52	0.909(0.81)	2.91
ΔBCI	-0.127(-0.88)	1.35	-0.148(-0.98)	1.59	-0.345(-2.19)***	2.15	-0.318(-2.69)**	1.51
ΔW	-	-	-0.000851(-0.11)	3.20	-	-	-0.00724(-1.01)	4.05
$\Delta \ln(\text{INFRA})$	-	-	-1.445(-1.04)	4.69	-	-	-1.812(-1.62)	4.74
$\Delta \ln(\text{CT})$	-	-	-14.16(-1.21)	2.29	-	-	-3.479(-0.29)	3.75
ΔFER	-	-	-	-	0.0993(2.50)**	2.30	0.112(2.51)**	3.62
$\Delta \ln(\text{INF})$	-	-	-	-	0.701(0.60)	1.13	1.137(0.98)	1.35
$\Delta \ln(\text{INT})$	-	-	-	-	0.763(0.88)	1.28	0.795(0.78)	2.21
Constant	-0.773(-0.80)	-	-0.00352(-0.00)	-	-1.353(-1.47)	-	-1.489(-1.13)	-
R ² value	0.454	-	0.628	-	0.702	-	0.820	-
Adjusted R ²	0.206	-	0.255	-	0.404	-	0.520	-
AIC	70.24	-	69.74	-	65.94	-	61.39	-
BIC	75.24	-	77.24	-	73.44	-	70.56	-
F-Value	1.829	-	1.685	-	2.358	-	2.731	-

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively

The results of the regression analysis made for the financial intermediaries and real estate activities sector are given in Table 9. According to the analysis results, no variable included in the Model (1) or Model (2) had any effect on the foreign direct investments received by the financial intermediaries and real estate activities sector. According to the Model (3) results, corruption had a significant but negative effect at 10% significance level ($t=-2.19$, $p<0.1$). On the other hand, foreign exchange rate had a significant and positive effect at 5% significance level ($t=2.50$, $p<0.05$).

According to the Model (4) results, export had a significant and positive effect at 10% significance level ($t=2.01$, $p<0.1$). In addition, foreign exchange rate had a significant and positive effect at 5% significance level ($t=2.51$, $p<0.05$). On the other hand, corruption had a significant but negative effect at 5% significance level ($t=-2.69$, $p<0.05$).

The results of the regression analysis made for the other services (electricity, gas, and water; construction; and hotels and restaurants) sector are given in Table 10. According to the analysis results, no variable included in the Model (1) or Model (2) had any effect on the foreign direct investments received by the other services sector. According to the Model (3) results, interest had a significant but negative effect at 10% significance level ($t=-1.96$, $p<0.1$). According to the Model (4) results, interest had a significant but negative effect at 10% significance level.

In this study, the factors influential on the sectors receiving foreign direct investments in Turkey and how such sectors were influenced were examined. The factors influential on foreign direct investments were searched by taking into consideration political stability. The results of the regression analyses made on the sample are summarized in Table 11 as positive (+), negative (-), and insignificant (0).

Table 10. Regression analysis results for the other services (electricity, gas, and water; construction; and hotels and restaurants) sector.

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF	Coefficient(t-statistic)	VIF
$\Delta \ln(\text{GDP})$	6.978(0.87)	3.26	8.723(0.89)	3.69	-0.202(-0.02)	3.97	-0.146(-0.02)	3.82
$\Delta \ln(\text{IMP})$	-1.371(-0.44)	5.44	-0.156(-0.04)	8.06	-0.397(-0.12)	7.47	-	-
$\Delta \ln(\text{EXP})$	-0.315(-0.09)	2.49	-0.509(-0.08)	5.63	-0.360(-0.09)	3.82	-0.324(-0.07)	4.73
PS	-0.191(-0.30)	1.24	-0.280(-0.29)	2.14	-0.238(-0.37)	1.52	-0.959(-1.02)	2.91
ΔBCI	0.0794(0.83)	1.35	0.104(0.87)	1.59	0.138(1.23)	2.15	0.155(1.56)	1.51
ΔW	-	-	-0.00299(-0.48)	3.20	-	-	0.000486(0.08)	4.05
$\Delta \ln(\text{INFRA})$	-	-	-0.289(-0.26)	4.69	-	-	-0.289(-0.31)	4.74
$\Delta \ln(\text{CT})$	-	-	0.523(0.06)	2.29	-	-	-9.637(-0.96)	3.75
ΔFER	-	-	-	-	0.0113(0.40)	2.30	-0.00363(-0.10)	3.62
$\Delta \ln(\text{INF})$	-	-	-	-	0.667(0.79)	1.13	1.107(1.15)	1.35
$\Delta \ln(\text{INT})$	-	-	-	-	-1.215(-1.96)***	1.28	-1.670(-1.96)***	2.21
Constant	-0.0622(-0.10)	-	-0.126(-0.11)	-	0.257(0.39)	-	1.027(0.93)	-
R ² value	0.175	-	0.205	-	0.480	-	0.571	-
Adjusted R ²	-0.200	-	-0.591	-	-0.041	-	-0.143	-
AIC	56.38	-	61.75	-	54.54	-	55.25	-
BIC	61.38	-	69.25	-	62.04	-	64.41	-
F-Value	0.466	-	0.257	-	0.922	-	0.799	-

Note: For p-values, *, **, and *** refer to the statistical significance levels of 1%, 5%, and 10% respectively.

Table 11. The summary of the analysis results

Variables	AM				MFG				WRT				TCS				FIREA				OS				TFI			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GDP	0	0	0	0	0	0	+	0	0	0	0	0	+	0	+	+	0	0	0	0	0	0	0	0	+	+	+	+
IMP	0	0	0	0	-	-	-	x	0	0	0	x	-	x	-	x	0	0	0	x	0	0	0	x	-	0	0	x
EXP	0	0	0	0	+	+	+	0	0	0	0	-	+	0	+	0	0	0	0	+	0	0	0	0	+	+	0	0
PS	0	0	0	0	0	0	0	0	0	-	0	-	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	-
BCI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	-	-	0	0	0	0	0	0	0	+
W	x	0	x	0	x	0	x	0	x	0	x	-	x	x	x	x	x	0	x	0	x	0	x	0	x	-	x	0
INFRA	x	0	x	0	x	0	x	0	x	+	x	+	x	0	x	0	x	0	x	0	x	0	x	0	x	-	x	-
CT	x	0	x	0	x	0	x	0	x	-	x	-	x	0	x	0	x	0	x	0	x	0	x	0	x	0	x	0
FER	x	x	0	0	x	x	-	0	x	x	0	0	x	x	-	-	x	x	+	+	x	x	0	0	x	x	0	0
INF	x	x	0	0	x	x	+	+	x	x	0	+	x	x	-	0	x	x	0	0	x	x	0	0	x	x	0	0
INTEREST	x	x	0	0	x	x	0	0	x	x	0	0	x	x	-	-	x	x	0	0	x	x	-	-	x	x	0	0

4. Conclusion

The examination of the foreign direct investments received by Turkey in the 1995-2012 period by sectors shows that the financial intermediaries and real estate activities sector came first and was followed by the manufacturing sector. Acquisitions and mergers taking place in the banking segment made a big contribution to the investments received by this sector. On the other hand, developments in the sub-sectors of textile and food increased the foreign direct investments received by the manufacturing sector.

The present study investigated the factors influential on the total foreign direct investments received by Turkey and on sectoral foreign investments. Gross domestic product, export, import, bribery and corruption index, wages, infrastructure expenses, real effective foreign exchange rate, inflation rate, and real interest rate were used in the regression analyses aimed at determining the economic factors and whether or not such factors varied by sectors. Moreover, all such economic influences were examined by taking into consideration political stability thought to be introduced by the single-party government period.

The regression analyses indicated that there was a positive relationship between the total foreign direct investments received by the sectors in Turkey and gross domestic product, export, and bribery and corruption index, but there was a negative relationship between the total foreign direct investments received by the sectors in Turkey and import, political stability, and infrastructure expenses. In addition, it was seen that the political stability introduced by the single-party government period had a negative effect on the sectors of wholesale and retail trade and transportation, communication, and storage services. The findings of the present study were quite consistent with the related literature. Gross domestic product and political stability had the same kind of relationship with the total foreign direct investments received by Turkey and the foreign direct investments received by individual sectors. On the other hand, it was seen that some economic factors did not affect the total foreign direct investments received by Turkey and the foreign direct investments received by individual sectors in the same way. While export had a positive effect on the total foreign direct investments, it had a negative effect on the wholesale and retail trade sector. Likewise, while bribery and corruption index had a positive effect on the total foreign direct investments, it had a negative effect on the financial intermediaries and real estate activities sector. This may be because; the amounts of foreign direct investments, the factors influential on decisions about foreign direct investment and the effects of foreign direct investments on the national economy vary from sector to sector.

Turkey needs clear and explicit sectoral regulations and arrangements for an appropriate economic climate for foreign direct investments. In addition, political, economic, and social environments should be arranged by paying regard to the interests of sectors. Sectoral needs should be taken into account when making decisions for infrastructure investments. To attract more foreign investments and obtain positive effects from such investments, Turkey should do long-term sectoral planning by keeping in mind that these

investments do not leave the country in the short-term. Furthermore, the bureaucratic procedures to be confronted by sectors should be minimized; more transparent policies should be implemented; and evaluations on the effects of foreign direct investments on economy should remember that there may be sectoral differences.

Note

- ⁽¹⁾ Agriculture and fishery, mining and quarrying (AM), manufacturing (MFG), wholesale and retail trade (WRT), transportation, communications, and storage services (TCS), financial intermediaries and real estate activities (FIREA), and other services (OS) (electricity, gas, and water; construction; and hotels and restaurants)

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Legislative contributions to improving the economic efficiency of the medical laboratories in Romania

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Abstract. *Improving economic activity in a business depends on the legislative framework. Thus, we have conducted a study that aimed to correlate the legislative changes with the economic activity of the medical laboratories in Romania.*

This article highlights through the conducted research the legislative contributions to the improvement of the economic activity in Romanian medical laboratories.

I conclude that the legislative changes in the period 2010-2015 had a positive impact on the economic activity of medical laboratories in Romania and the quality of their activities.

Keywords: legislation, equipment, laboratory specialists.

JEL Classification: K00.

Introduction

There are three main types of health systems based on the sources of funding:

- social health insurance system, called also the Bismarckian system introduced in Germany in the late 19th century, based on compulsory insurance premiums dependent on income and not the health of the insured;
- National Health System, called also the Beveridge model, named after the man who introduced in England after the Second World War, financed through taxes;
- the voluntary insurance services met if private health insurance premiums is correlated with the risk insured.

The health system in Romania is a Bismarck type of health system, the source of fundings is ensured through the compulsory contribution insurance for health; social health insurance is required from both the employer and the employee.

The health systems offers medical services.

Medical services are services provided by organizations operating in the health sector: hospitals, doctors, public and private medical centres that can be classified according to the services rendered:

- Laboratory medicine services - provided by medical laboratories;
- Occupational health services - provided by occupational medicine clinics;
- Emergency medical services - provided by emergency units;
- General medical services - provided by medical doctors' offices;
- Specialized medical services - provided by specialized medical doctors' offices.

Medical services offered to customers, including the services of medical laboratories depend on the manner of their funding.

The main sources of raising funds for healthcare are:

- Mandatory insurance premium for the entire population, regardless of the health of those who pay;
- General taxes that are collected from by the state and then distributed to the health sector under the budget approved by the competent body such as the Parliament in Romania;
- Voluntary insurance premiums, which are correlated with the health of insured persons;
- Direct payment of health services by the population in their use and co-payment.

The health services of the country cannot be financed exclusively through one mechanism and therefore different forms of funding can co-exist at the same time:

- Government funding based on taxes collected;
- Social health insurance;
- Private health insurance;
- Direct payment of the medical services by customers and co-payments.

Laboratory medicine services - provided by the medical laboratories are an important part of laboratory services whose legal framework for the operation and organization is defined by the Minister of Health No. 119/2004 replaced by the Minister of Health

1301/2007 Rules on operation medical analysis laboratories, stipulating at art. 2 that "medical analysis laboratory is the unit belonging to public and private system, with or without legal personality, which provides medical laboratory services.

Medical laboratory services consist of:

- a) Analysis of materials from the human body through various methods and techniques of biochemistry, hematology, immunochemistry, immunology, microbiology, genetics, cytology, pathology, toxicology, molecular and cellular biology, biophysics, etc., in order to provide information for diagnosis, treatment and prevention of disease or for assessing the health of the population;
- b) Advice on the interpretation of the results of any investigations carried out and for further investigation if necessary."

The end result of medical laboratories is the medical analysis reports containing the patient's medical test results.

The quality of the results (values) of medical tests performed by medical laboratories are influenced by several factors:

- Specialists (number, training and professional experience, their motivation, etc.)
- Facilities, equipment, environment, number of tests performed per hour, automatic or semiautomatic type of machine, measurement methods - examination;
- Reagents, consumables;
- Internal quality control that checks how the device, professionals, reagents and quality working environment are working;
- External quality control that checks the statistical comparability of results regardless of device patients, specialists, quality reagents and working environment;
- The legislative framework for the organization, operation and financing of medical laboratories;
- Laboratory management.

Medical Laboratories contracting analysis reimbursed by the National House of Health Insurance (CNAS) from the health insurance budget must perform a minimum of four annual rounds in external quality control to receive a minimum score and enter the contractual relationship with the National House of Health Insurance – in order to fulfil the quality criteria of the law – Annex. 19, Chapter II, lit. B, Section 2, quality criterion, letter b). – Detailed implementation rules for applying the Contract – Framework for medical assistance in the social health insurance system.

Official documents that refer directly to external quality control which that are also called proficiency testing scheme providers are:

- ISO Standard 17043: 2010 General Requirements for Conformity Assessment proficiency tests;
- Minister of Health no. 2071 from 2007 regarding the notification by the Ministry of Health of the providers of proficiency testing schemes;
- Specific Rules of accreditation for providers of proficiency testing standard 17043: 2010;

and other important references exists in the ISO 15189: 2013 standard for Medical Laboratories regarding the Requirements for quality and competence, the Minister of Health's order number 1301 from 2007 Norms on the Functioning of medical analysis laboratories and rules for the application of the Contract - Framework medical assistance in social health insurance system.

The national legislation with direct impact on the funding of medical laboratories analysed in this study consists of the annually Orders joint approved by the Minister of Health and the President of the Romanian National House of National Health Insurance that implements rules as an Appendix – to the Frame contract for healthcare within the system health insurance.

From the comparative analysis of the stipulations of the Methodological Norms for the period 2010-2015 Contract – Framework regarding the conditions of providing medical assistance in social health insurance system for medical laboratories we observed that from the criteria for selecting healthcare providers of medical analysis the financial terms were eliminated which had a share of 10% in 2010, 5% in 2011 and 2012 and since 2013 has been eliminated as an evaluation and score criteria for medical laboratories in contract with CNAS, the 5% previously granted to the Financial criteria being distributed to the Resource evaluation criteria.

We analyzed the legislative changes of the Methodological Norms for the period 2010-2015 regarding the assessment of technical capacity of the resources and the evaluation of human resource assessment:

- a) increasing of the score for automatic analyzers compared to the semi-automatic considering both speed - the number of tests per hour, the number of parameters and technique used, being better scored modern analytical techniques for devices from all three compartments in the study: Biochemistry, Hematology and Hemostasis;
- b) increase of the score for human resources.

To study the impact of legislative changes regarding the increase of the scores granted by CNAS to contracting analysis with medical laboratories for equipment and human resources over the economic activity of medical laboratories we used information of 84 national medical laboratories from Bucharest and 28 counties participating during 2010 - 2015 on external quality control organized by a national supplier.

Maintaining the confidentiality for the surveyed medical laboratories is ensured by allocating a number from 1-84 to each medical laboratory.

Specialists in medical laboratories

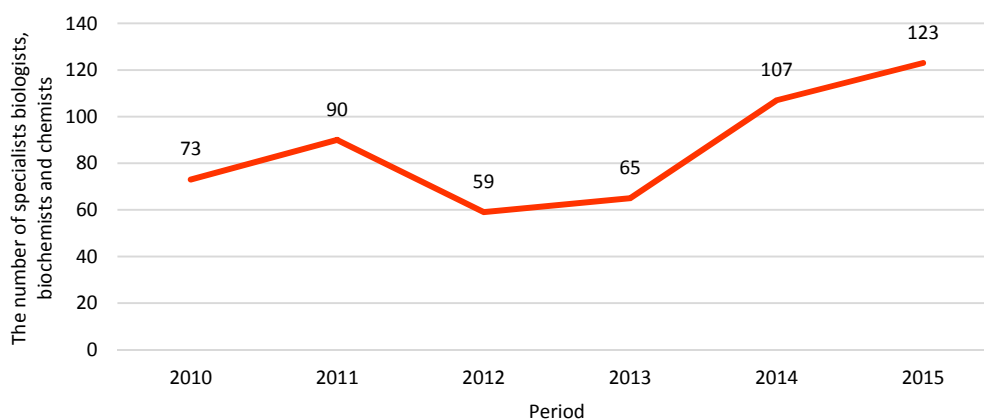
Each medical laboratory that wants to enter into a contractual relationship and to obtain money from CNAS must have a doctor specialized in laboratory medicine hired according to Co-Ca Norms, so every medical laboratory participating in this study has at least one doctor specialized in laboratory medicine hired and that is why we studied in this paper only the number of specialists employed as authorized biologists, chemists, biochemists and that are in the records of the professional organization.

Data analysis shows that the number of specialists employed in medical laboratories in 2015 is:

- Almost 2 times higher than in the private sector in 2013 (Figure 1)
- Over 4 times higher than in the public system in 2013 (Figure 2)

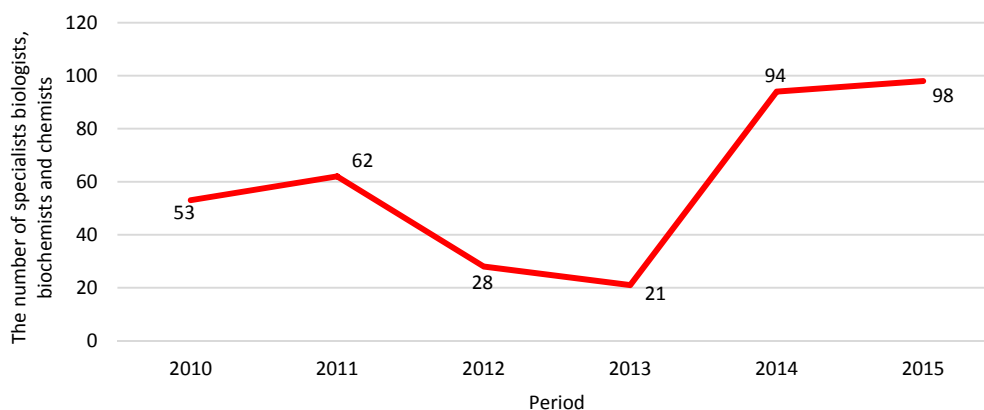
by increasing the score for the main specialists from 16 to 25 points, for those with a medical speciality from 14 to 20 points and for those without a medical speciality from 10 to 15 points.

Figure 1. *Evolutions of the number of specialists hired between 2010 and 2015 in the private medical laboratories participating in the study*



Source: according to the research.

Figure 2. *Evolutions of the number of specialists hired between 2010 and 2015 in the public medical laboratories participating in the study*



Source: according to the research.

Equipment

Medical analysis laboratories activity cannot take place without equipment, reagents, calibrators, supplies, etc.

In this paper we analyzed the equipping of the 84 medical laboratories studied during 2010 - 2015 for each department of biochemistry, hematology, hemostasis, the evolution of CNAS score for types of equipment in the fields of biochemistry, hematology, hemostasis and the number of equipments/year that are in their use during 2010-2015 .

The equipment identified are those specified by medical laboratories as participants in external quality control.

For equipment - medical devices of laboratories participating in the study we didn't found an increase in numbers, the predominance of a particular type or model probably due to numerous factors influencing the purchase of some equipment – their cost of reagents, consumables, internal control and but also score granting criteria from CNAS to contracting medical tests when taking into account the age of the equipment, their type – automatic or semi-automatic, the number of tests per hour, methods, etc. but there are certainly also commercial factors influencing the purchase of equipment.

The funds allocated to medical laboratories from the health insurance budget

Funds from the health insurance budget are allocated to medical laboratories according to criteria for selecting healthcare providers of medical laboratory services by adding the amounts determined as follows:

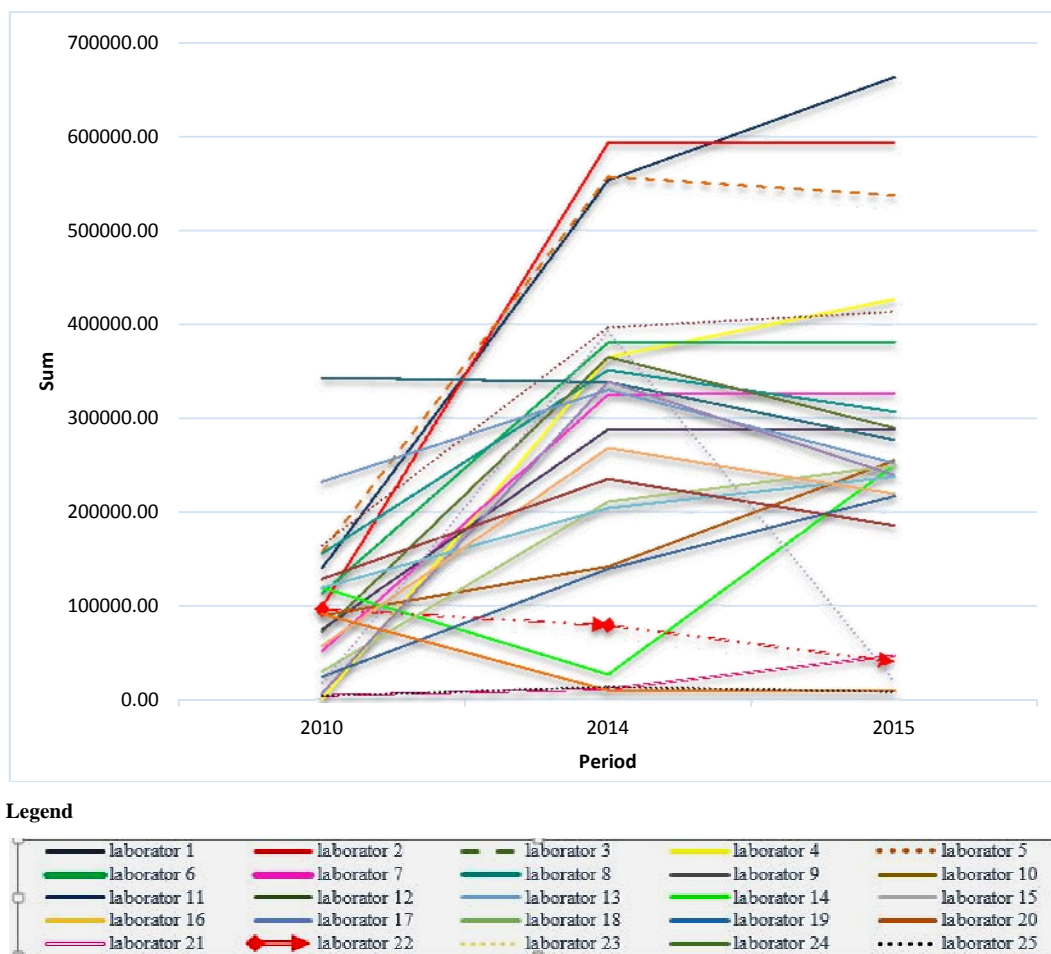
- Adding the number of points obtained by each supplier for each criteria/ sub criteria and thus establishes the total number of points obtained;
- The value of a point for each criteria/sub criteria is calculated by dividing the sum resulted as a result of applying percentage at the number of points suitable to each criteria/sub criteria;
- the value of a point obtained for each criteria/sub criteria is multiplied by the number of points obtained by a supplier suitable to each criteria/sub criteria, resulting the sums for each criteria/sub criteria for each supplier.

For the 84 medical laboratories studied during 2010-2015 we followed the websites of Regional Counties Health Insurance Houses and the Health Insurance House of Bucharest the funds allocated from the budget of the National Health Insurance keeping confidentiality of medical laboratories surveyed by allocating a number to each medical laboratory.

We found complete data on the funds allocated from the budget of the National Health Insurance for 25 of the 84 medical laboratories surveyed for the years 2010, 2014, 2015.

From the data analysis we observed an increase in funds allocated from the budget of the National Health Insurance House for 23 medical laboratories only two with a decrease of allocations by CNAS (Figure 3).

Figure 3. Situation of funds allocated by the National Health Insurance medical laboratories participating in the study for 2010, 2014, 2015



Source: according to research performed.

In Table 1 we present the comparative tariff situation in RON per medical analysis in the fields of biochemistry, hematology and haemostasis as CO-CA Norms for the years 2010 to 2015 settled to medical laboratories by the National Health Insurance in the period 2010-2015.

We can point out that the prices were the same for all analyses and studied parameters during 2010-2015, with a slight increase in 2014 and maintaining the same value in 2015 with the exception of Quick Time analysis of which price increased.

Table 1. Comparison of tariffs lei to medical tests according to Contract Regulations – Framework for the years 2010-2015

Biochemistry

No.	Name of analysis	Code	Tariff 2010 (lei)	Tariff 2011 (lei)	Tariff 2012 (lei)	Tariff 2013 (lei)	Tariff 2014 (lei)	Tariff 2015 (lei)	Code of analysis in 2014
1	Serum urea	21120	5.46	5.46	5.46	5.46	5.86	5.86	21011
2	Serum uric acid	21130	5.46	5.46	5.46	5.46	5.86	5.86	21012
3	Serum creatinine	21140	5.52	5.52	5.52	5.52	5.92	5.92	21014
4	Magnezemia	21570	5	5	5	5	5.37	5.37	210505
5	Sideremia	28390	6.62	6.62	6.62	6.62	7.1	7.1	210506
6	Glucose	21310	5.35	5.35	5.35	5.35	5.74	5.74	21020
7	Total serum cholesterol	21420	5.35	5.35	5.35	5.35	5.74	5.74	210303
8	TGO	24600	5.43	5.43	5.43	5.43	5.83	5.83	210403

Hematology

No.	Name of analysis	Code	Tariff 2010 (lei)	Tariff 2011 (lei)	Tariff 2012 (lei)	Tariff 2013 (lei)	Tariff 2014 (lei)	Tariff 2015 (lei)	Code of analysis in 2014
1	HLG full - Hb, Ht, no. erythrocytes, no. white blood cells, no. platelets, FL, red cell indices	28070	10.27	13.06	13.06	13.06	14.01	14.01	26001

Haemostasia

No.	Name of analysis	Code	Tariff 2010 (lei)	Tariff 2011 (lei)	Tariff 2012 (lei)	Tariff 2013 (lei)	Tariff 2014 (lei)	Tariff 2015 (lei)	Code of analysis in 2014
1	Quick Time active. prothrombin	28621	6.73	6.73	6.73	6.73	10.7	14.68	26101
2	Fibrinogenemie	23210	12.75	12.75	12.75	12.75	13.68	13.68	26103

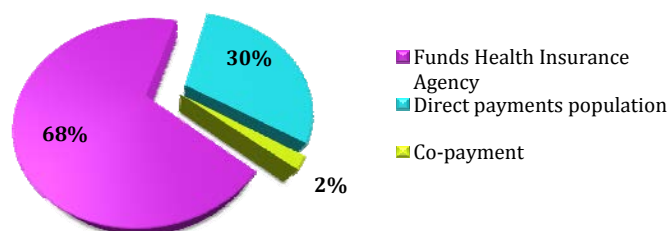
Source: according to research performed by accessing www.cnas.ro

The direct impact of the legislation on the medical laboratories in Romania

In 2012 we distributed the questionnaire to evaluate "the impact of the legislative amendments on the funding of medical laboratories" to a number of 130 medical laboratories in Romania and received completed questionnaires with 52 responses.

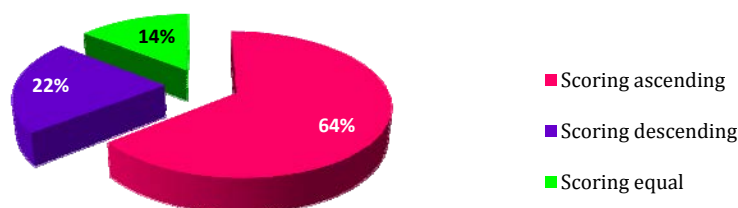
Centralization of the replies to 9 out of the 10 questions in the questionnaire (because the last question of the questionnaire was related to proposals for improving the existing legislation and participants' responses were not included in this study) revealed the following:

- 1) 68% of respondents answered to question 1 that laboratory funding consists for more than 50% of direct payments from the population while 30% reported that that laboratory funding consists for more than 50% of consists of funds from the National Health Insurance House (CNAS) – Figure 4;

Figure 4. *Financing of medical laboratory*

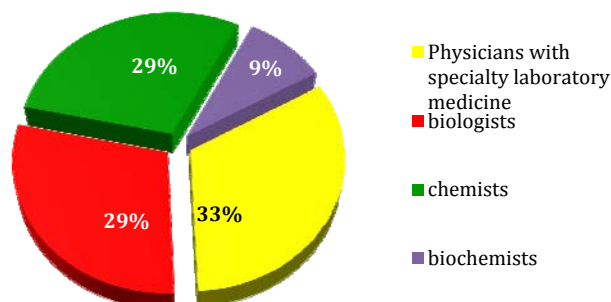
Source: according to the performed research.

- 2) The score obtained by the medical laboratory from the National Health Insurance House (CNAS) in the period 2010 to 2012 for the laboratories studied was as follows: an increase of the score for 64% of medical laboratories, decrease for 22% of the laboratories and the same score for 14% of the participating medical laboratories study – Figure 5.

Figure 5. *The score obtained by medical laboratories from the National Health Insurance in the period 2010-2012*

Source: according to the performed research.

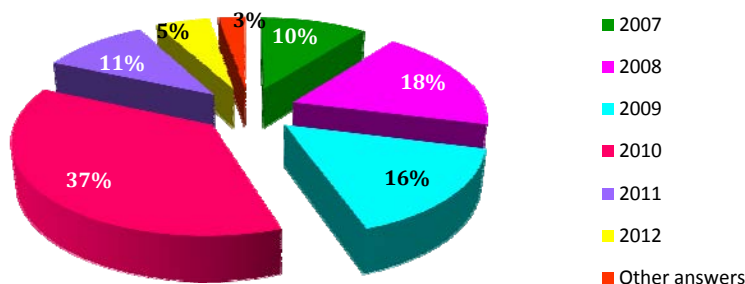
- 3) The employees in the medical laboratories: 33% are doctors specialized in medical laboratory, 29% biologists, 29% chemists and 9% biochemists according to the answers at question no. 3 of the questionnaire (Figure 6).

Figure 6. *Specialists employed in medical laboratories*

Source: according to the performed research.

- 4) Most of the respondent laboratories, 37%, said they have implemented a quality management system according to EN ISO 15189: 2007 in 2010 (Figure 7).

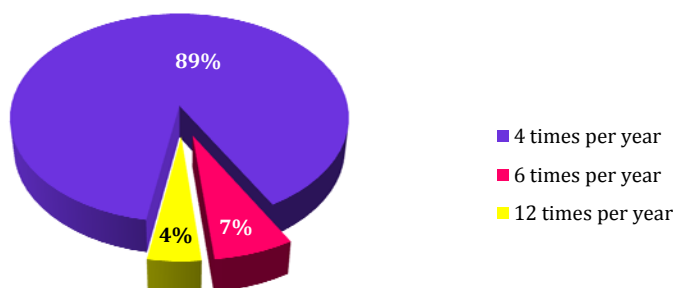
Figure 7. The year declared by participants in the study for the implementation of quality management system according to ISO standard 15189: 2007



Source: according to the performed research.

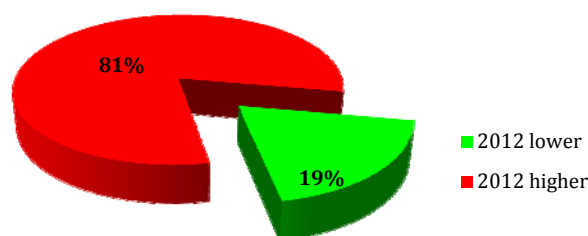
- 5) 89% of the medical laboratories surveyed said they participate in proficiency testing schemes (external quality control) 4 times a year, 7% participating 6 times a year and 5% participating 12 times a year – Figure 8;

Figure 8. Frequency of participation in external quality control of medical laboratories questioned



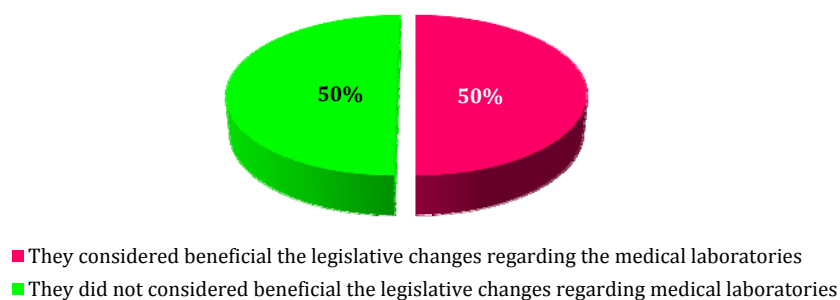
Source: according to the performed research.

- 6) 81% of the medical laboratories said that the score from CNAS in 2012 was higher compared to 2011 (Figure 9).

Figure 9. *The score obtained by medical laboratories questioned in 2012 compared to 2011*

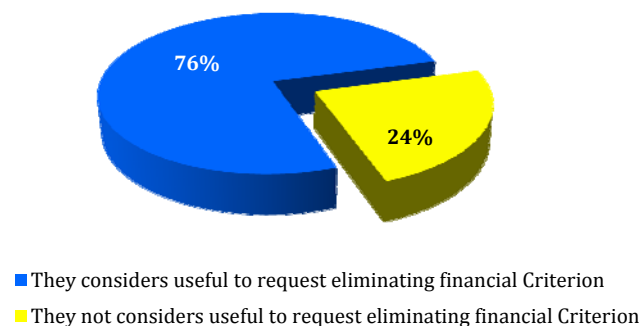
Source: according to the performed research.

- 7) 50% of the medical laboratories surveyed said they considered beneficial legislative changes related to medical laboratories in the period 2008-2012 and the same percentage 50% is not considered beneficial laboratory (Figure 10).

Figure 10. *The usefulness of legislative changes regarding the medical laboratories between 2008 and 2012*

Source: according to the performed research.

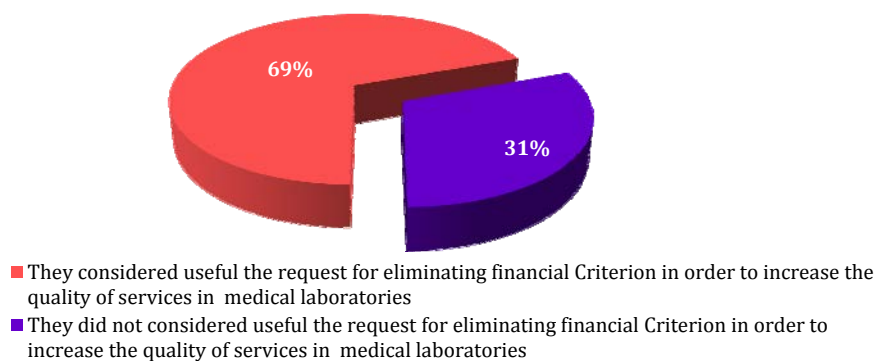
- 8) 76% of the medical laboratories consider relevant the request for eliminating the financial Criterion (point 3 A, Chapter II of the Rules on the Framework Agreement for 2013 (Figure 11).

Figure 11. *The usefulness of the request to eliminate financial criterion*

Source: according to research performed.

- 9) 69% of the surveyed medical laboratories consider that abolishing the financial Criterion rules in the 2013 Framework Agreement would help to increase service quality in the medical laboratories (Figure 12).

Figure 12. *The usefulness of the request to eliminate financial Criterion to increase the quality of medical services*



Source: according to research performed.

Conclusion

The study conducted between 2010 and 2015 on legislative changes on the economic activity of medical laboratories has revealed the following:

1. The financing of the medical analysis laboratories in the period 2012-2013 still comes for more than 50% from direct payments of the population, according to the responses to questionnaires (68% of respondents) although the funds allocated from the budget of the National Health Insurance increased throughout the period 2010-2015.
2. The funds allocated from the budget of the National Health Insurance (CNAS) increased steadily during the period 2010-2015 for 23 of the 25 medical laboratories studied, only two medical laboratories reported a decrease of allocations by the National Health Insurance in 2010, 2014, 2015.
3. 50% of medical laboratories surveyed said that legislative changes regulating the medical laboratories in the period 2008-2012 were beneficial and the same percentage 50% have not considered them beneficial to their activities.
4. 76% of the medical laboratories found useful the removal of the financial Criterion in 2012 from the Framework contract and 69% of the medical laboratories considered that eliminating the financial Criterion rules in the 2013 Framework Agreement would help to increase service quality medical laboratories.
5. The financial criterion has been removed by the National Health Insurance from 2013 as an evaluation criteria and the score granted before for the medical laboratories, the 5% previously granted for the financial criteria in 2011 and 2012 was distributed for the criteria of resource evaluation.

6. The increase of the medical laboratories funds allocated from the budget of the National Health Insurance was realized by increasing the laboratories scores awarded for the performance assessment criteria.
7. In the period from 2010 to 2015 we observed an increase in the number of specialists employed in medical laboratories; in 2015 their number is:
 - Almost 2 times higher than for the private laboratories in 2013.
 - Over 4 times higher than in 2013 for the public laboratories.
8. The increase of the number of specialists employed by the medical laboratories in the period 2010-2015 is in close correlation with increased scores awarded for Principal professionals (biologists, chemists, biochemists) from 16 to 25 points, for those with a Medical Speciality from 14 to 20 points and for those without a medical specialty from 10 to 15 points over the same period from 2010 to 2015.
9. We found no correlation between equipping - acquisition of devices and the medical laboratories score awarded by the National Health Insurance Fund for the period 2010-2015.
10. Prices in lei per medical analysis in the fields of Biochemistry, Hematology and Haemostasis under Contract Regulations - Framework for the years 2010-2015 were the same for all analyses and studied parameters during 2010-2015, with a slight increase in 2014 and a stagnation in 2015 except Quick Time analysis whose price rose.

References

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- www.cnas.ro
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- Order No. 265/408 of 1 April 2010 approving the Methodological Norms for the application of the Framework Agreement on the conditions of granting medical assistance within the health insurance system for 2010.
- Government Decision No. 1389/2010 for the approval of the framework conditions for granting medical assistance within the health insurance system for the years 2011-2012.
- Order No. 864/538 of 31 May 2011 approving the Methodological Norms for the application of the Framework Agreement on the conditions of granting medical assistance within the health insurance system for 2011.
- Government Decision No. 1389/2010 for the approval of the framework conditions for granting medical assistance within the health insurance system for the years 2011-2012.
- Order No. 1723/950 of 20.12.2011 approving the Methodological Norms for the application of the Framework Agreement on the conditions of granting medical assistance within the health insurance system for 2012.

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Order No. 864/538 of 31 May 2011 approving the Methodological Norms for the application of the Framework Agreement on the conditions of granting medical assistance within the health insurance system for 2013.

Government Decision No. 400/2014 approving the Framework Agreement on the conditions of granting medical assistance within the health insurance system for the years 2014-2015.

Order No. 619/360 from 29.05.2014 approving the Methodological Norms for the application of the Framework Agreement on the conditions of granting medical assistance within the health insurance system for 2014.

Government Decision No. 400/2014 approving the Framework Agreement on the conditions of granting medical assistance within the health insurance system for the years 2014-2015.

Order No. 388/186 of 31 May 2015 approving the Methodological Norms for the application of the Framework Agreement on the conditions of granting medical assistance within the health insurance system for 2015.