8. ESTIMATING THE IMPACT OF CENTRAL BANK INDEPENDENCE UPON MACROECONOMIC PERFORMANCE USING A PANEL DATA MODEL

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Abstract

This paper analyzes a new index for measuring central bank independence and inflation targeting in order to evaluate and assess the impact of central bank's independence level upon the macroeconomic performance. The new index for measuring central bank independence and inflation targeting has three main pillars: central bank political and legal independence, central bank governance and conduct of monetary policy and central bank transparency and accountability. Moreover, the paper intends to evaluate the impact of central bank independence based on the new index upon some macroeconomic indicators, such as the inflation rate, the output, the unemployment rate, the budgetary deficit and the current account deficit.

Keywords: index of central bank independence and inflation targeting, central bank governance, central bank transparency and accountability, political and legal central bank independence, inflation rates, panel data

JEL Classification: E50, E52, E58

I. Introduction

Since the 1970's, many central banks around the world, especially those in industrialized countries, have evolved from being "governments' tools" for achieving specific economic objectives into independent institutions devoted to maintain the fundamental public good: price stability. This fundamental shift towards central bank independence and adoption of price stability as the single objective of monetary policy has converged worldwide, the central banks in emerging market economies and developing countries have followed similar paths.

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This new orthodoxy oriented towards a credible and independent central bank is based on a three-fold foundation: the success of the Bundesbank and the German economy over the past fifty years and its successor, the European Central Bank; the theoretical and academic literature on time inconsistency problem and on inflationary bias of discretionary policy-making; the empirical academic literature on central bank independence.

The move from an institutional model whereby the central bank's main purpose is to be "one tool" in the hands of the government in order to accomplish several economic objectives, to the model that price stability is the main objective of the monetary policy, is based on the empirical evidence regarding the positive impact of central bank independence on macroeconomic performance, especially in achieving lower inflation rates, on cushioning the impact of political cycles on economic cycles, on boosting fiscal discipline without any additional costs or sacrifices in terms of output volatility or reduced economic growth (Ilieva, Harrison&Healey, 2004; Laurens, 2005).

As the concept of central bank independence has become largely accepted and widely used in theory and practice, the concept of central bank accountability has emerged, because an independent central bank must be accountable to the public's opinion directly and to parliament. Accountability is an essential condition for the central bank in building credibility vis-á-vis capital markets and for its acceptance by the citizens in a democratic society. A third very important concept that has increasing importance in the monetary policy process is the central bank transparency, which is reflected by the fact that nowadays most central banks have an external website and a commitment to external disclosure. Moreover, central banks release a large amount of information to their stakeholders, whether it is required or done spontaneously.

Another very important aspect highlighted in the literature on central bank independence represents the *legalistic illusion* debated by André Orléan (2008), which views the enforcement of the law as the main source of credibility. It's almost visible manifestation can be found in the importance attached to the central banks' statutes. Thus, for example, most of the indicators able to measure the independence of the central banks are constructed by encoding legal data, and especially their statute. This *legalistic conception* has already been the object of criticism; it has been pointed out that a wide discrepancy can exist between *de jure* independence, measured by these indicators, and *de facto* independence, as revealed by actual behavior. Two explanations might exist: either the incompleteness of the law, with grey areas in terms of definition of rights and obligations, or structural and significant differences between the provision of the law and the actual practices.

Most empirical studies dealing with the relationship between central bank independence and macroeconomic performances focused on the impact of central bank independence upon the inflation level and its volatility. The main findings of these studies suggest a negative correlation between the central bank independence and inflation, especially in the developed countries; the indices used to proxy central bank independence were based on analyzing the central bank statutes and, therefore, leading to *de jure* independence. Because of some wide discrepancy between the provision of the law and the actual level of independence, especially in the emerging and developing countries, *de facto* independence indices were constructed.

De jure independence may also underestimate *de facto* independence, for example for the case of several inflation targeting regimes of central banks where the formal specification of the framework, which may not be included in the central bank law's, plays an important role in terms of central bank independence (Roger, 2006). The studies focused on the developing countries show a negative correlation between *de facto* independence and inflation and a positive correlation between economic growth and *de facto* indicators.

The model constructed using the new index for measuring central bank independence and inflation targeting highlights the relationship between the central bank independence and macroeconomic performances. Central bank independence can generate effects on the level and volatility of inflation, can influence the level of the GDP, can reduce the unemployment rate, and decrease the level of budgetary deficit and the current account balance. Moreover, the central bank independence level can also influence some other variables, such as the central bank monetary policy interest rate or exchange rate.

II. Former Indices of Central Bank Independence and Their Correlation with the Macroeconomic Performance

The most widely used indices in the economic literature to measure central bank independence are those developed by Bade&Parkin (1977), Alesina (1988, 1989), Grilli, Masciandaro&Tabellini (1991), Cukierman (1992), Alesina&Summers (1993), Eijffinger&Schalling (1993), Cukierman&Webb (1995). These indices represent the most comprehensive ones and although they were constructed and tested a long time ago, the most recent empirical studies dealing with the relationship between central bank independence and macroeconomic performance use such indices. Central bank independence indices are classified into two main groups: three of them are actual indices and are used for measuring *de facto* independence, while the other six are used to measure legal or *de jure* independence.

The first attempt to measure central bank independence was the index developed by Bade&Parkin (1977), who analyzed the correlation between the monetary policy process and central bank statutes in twelve industrial countries, for the period 1951-1975 and based on some aspects, such as: the legal provision of the central banks' primary objective, the structure of the Governing Board and the appointment and dismissal procedures for the senior management. The authors identified four important types of central banks, which were ranked from one (the lowest level of independence) to four (the highest level of independence). They showed that an independent central bank having price stability as the single objective is interconnected with achieving a lower level of average inflation, but an independent monetary authority in terms of policy-making and Board appointments may deliver a lower level of inflation, but not necessarily a low degree of variability in monetary policy.

Alesina (1988, 1989) overhaul, improve and extend the Bade&Parkin index, combining theories on political cycles and rational expectations. According to the

author, central bank independence is negatively correlated with the average rate of inflation; in his studies he expands the sample with five more countries: New Zealand, Spain, Denmark, Norway, and Finland over the period 1973-1986.

In 1991, Grilli, Masciandaro and Tabellini developed the GMT index for measuring central bank independence in eighteen OECD countries over the period 1950-1989, focusing both on political independence (seen by the authors as independence in setting the final objectives) and economic independence (seen by the authors as autonomy in establishing the monetary policy instruments). The authors suggest that an independent central bank gains always benefits in terms of low inflation and monetary stability, the coefficients for both indices always have the expected negative relationship; they find no systematic effect between central bank independence and the economic growth. As for the correlation between central bank independence and the unemployment rate, the authors suggest that an independent central bank not only leads to a lower level of inflation but does not involve sacrifices in terms of macroeconomic performance.

The most comprehensive indicators for measuring central bank independence are those constructed by Cukierman (1992). The LVAU (simple legal index) and LVAW (weighted legal index) are both legal indices, made up of sixteen variables that provide a detailed overview of the legal framework of the central banks; the sample is for 70 countries and the results show a high degree of independence for the developed countries, while the bottom of classification is dominated by the emerging and developing countries. Cukierman also elaborates the turnover rate of central bank governors (TOR) as a *de facto* independence index for the purpose of identifying the actual deviation from the law. The main idea of this index is that the central bank governor's term of office must be longer than the average term of a government, for ensuring a long-term view for the central bank. The results reveal that TOR is not efficient for the OECD countries, where for the developing countries is a useful proxy for measuring central bank independence, because these countries' practices deviate from the law. The last of the indicators elaborated by Cukierman (1992) are QVAU (a simple *de facto* index) and QVAW (weighted *de facto* index), which are based on responses to a questionnaire regarding the central banks' actual practices by qualified staff at twenty-four central banks; the questions are focused on the compliance of the monetary instruments that are used in practice by the central banks and if they differ from the law. The impact of central bank independence on inflation performance is summarized by Cukierman as follows:

- the regression of inflation on the LVAW in case of the developed countries shows a negative relationship, which confirms the hypothesis: *de facto* measures would be better proxies for independence in the less developing countries;
- the regression of inflation on the QVAV and QVAW indices shows that these indices have the expected negative sign, while the overall contribution of the index to explaining inflation performance is low;
- adding LVAW measure of independence does not provide much additional information, while adding the TOR measure does.

Alesina&Summers (1993), based on the indices constructed by Bade&Parkin (1977), Alesina (1988, 1989) and Grilli, Masciandaro&Tabellini (1991) developed an index

covering political and economic dimensions. The Alesina&Summers index in the arithmetic means of the combined GMT index and Alesina index is measured for the period 1955-1988 comparing with some macroeconomic variables such as: inflation, real GDP growth rates and per capita GDP, unemployment rates and interest rates. The authors find a negative correlation between central bank independence and the average and variance of inflation, while regarding the relationship between central bank independence and unemployment rate, GDP growth and interest rate movements the relationship is not clear.

Eijffinger and Schaling (1993) developed an index of political independence based on the GMT (1991) index having as variables the appointment and dismissal procedures of the central bank board, the monetary policy objectives formulated by the central bank or the government, the pursuit of the monetary policy objectives.

The political vulnerability of central banks is an informal index developed by Cukierman and Webb (1995), especially for the developing and emerging countries. The index is measured as the central bank governor's propensity to leave office in periods following a government transition or a significant political change. The authors analyzed sixty-seven countries: twenty OECD and forty-seven developing and emerging countries for the period 1950-1989, with two sub periods: 1950-1971 – the Bretton Woods period and 1972-1989 – flexible exchange rate period. According to this study, the vulnerability is over three times higher in the developing and emerging countries[2]. Moreover, the developing countries with high instability have more vulnerable central banks. Cukierman and Webb (1995) show that the central bank political vulnerability as well as non-political TOR has a significant positive impact on the inflation rate and its variability; high level of political instability contributes only marginally to an increase in average inflation. As for the growth performance, greater political dependence tends to slow down growth. Nonetheless, the authors find that with regard to the variability of the interest rates, both non-political TOR and the political vulnerability index increase the variance of interest rates, while regarding the average level of interest rates, the political vulnerability index exhibits a significantly negative sign, which reflects the higher implicit inflation tax in countries with politically dependent central banks.

Bowman, Jong-A-Pin and de Haan (2005) analyze the relationship between central bank independence and inflation based on a data set established by Sturm and de Haan (2001), using the TOR of the central bank governors as a proxy for central bank independence in a fifty-seven developing countries sample and for the time period 1975-1998. The authors use the multivariate (quintile) regressions and include: an indicator for openness, the log of the GDP per capita at the beginning of the period, an exchange rate dummy variable, the average external debt-to-GDP ratio and an indicator for political instability measuring the number of government transfers in the sample period. The final results of this study show a significant positive relationship between inflation and TOR; central bank independence is significantly related to inflation in high inflation countries but not in low inflation countries.

[2] *VUL (i)* = Number of governors TOR within *i* months from political transition / Number of political transitions (i = 1 to 6).

More recent empirical studies present an update of the GMT index of central bank independence based on central bank legislation as of end-2003 (Arnone, Laurens and Segalotto, 2006); the index is applied to a set of OECD, developing countries and emerging market economies. According to Arnone, Laurens, Segalotto and Sommer (2008) and based on the previous work of the authors, a sharp move towards greater economic and political independence can be observed, both in developed countries, developing countries and emerging market economies.

More recent empirical studies analyze the correlation between central bank independence and ageing, where inflation is explained by five age group shares of population: 15-29 years, 30-49 years, 50-64 years, 65-74 years and 75 years or more (Farvaque, Héricourt and Lagadec, 2009). The authors used for measuring central bank independence the Cukierman (1992) LVAU index in order to evaluate the part played by the elderly in the disinflationary process; the study used data on Consumer Price Index (CPI), on real GDP, exports and imports for twenty-one OECD countries and a time period divided into three sub-periods: 1960-1972 (significant, but controlled inflation), 1973-1979 (stagflation) and 1980-1994 (sustained disinflation). The results show that recent demographic trends in the developed countries weight more on inflation than on central bank independence, as opposed to the previous periods.

The relationship between central bank independence and inflation was analyzed also by Carlstrom and Fuerst (2009) using the Bade and Parkin (1977) index and the Alesina and Summers (1993) index and the average inflation rate, for the period 1988-2000 in twenty-six industrialized countries. The authors conclude that the independence measure has significantly increased across time for nearly all central banks in the survey; the slope of the linear relationship between inflation and independence reported in Alesina and Summers (1993) is statistically identical to the fitted slope in more recent data; increased independence is responsible for nearly two-thirds of the decline in the inflation rates in the industrialized countries as a whole.

III. Constructing and Measuring the New Index of Central Bank Independence and Inflation Targeting

The previous section has proved that the vast majority of the empirical studies dealing with the interconnections between central bank independence and macroeconomic performance confirm a negative correlation between central bank independence and inflation. The extent of central bank independence is measured with the help of legal indices for the industrialized countries, while for the developing countries variables such as the actual turnover rate of central bank governor or the political instability are used as proxies for the actual independence. However, increasing central bank independence might be combined indirectly with higher costs in terms of real economic performance and disinflation costs positively correlate with the degree of central bank independence.

In order to evaluate more accurately the impact of central bank independence upon macroeconomic performance it was necessary to develop an index to eliminate the gap between *de jure* (legal) independence and *de facto* (actual) central bank

independence; moreover, this was very important in order to evaluate the impact of central bank independence on several macroeconomic variables: inflation, output, unemployment rate, fiscal deficit and current account deficit, both in developed and emerging countries.

Table 1

Main Variables of Central Bank Independence and Inflation Targeting Index

Term of office of Governor (CEO)	P_{PL1}	*Political and legal central bank independence (PLCBI) - Pillar I -*
Legal power to appoint the Governor (CEO)	P_{PL2}	
Legal power to dismiss the Governor (CEO)	P_{PL3}	
Does Governor/CEO holds any other office in the Government?	P_{PL4}	
Turnover rate of central bank Governor (TOR)	P_{PL5}	
Political vulnerability of central bank Governor	P_{PL6}	
Status of the Management Board of the central bank	P_{PL7}	
Appointment of Board Members of the central bank	P_{PL8}	
Term of office of the Board Members	P_{PL9}	
Price stability	P_{GC1}	*Central bank governance and conduct of monetary policy (CBGCMP) - Pillar II -*
Monetary policy strategy	P_{GC2}	
The degree of Goal and Target independence	P_{GC3}	
The degree of instrument independence	P_{GC4}	
General policy conflicts	P_{GC5}	
Interest rate	P_{GC6}	
Intervention of foreign exchange market	P_{GC7}	
Regulation of foreign exchange market	P_{GC8}	
Foreign exchange borrowings	P_{GC9}	
Financial supervision	P_{GC10}	
Lending to the government	P_{GC11}	
Terms of lending	P_{GC12}	
Maturity of loans	P_{GC13}	
Interest rates of loan	P_{GC14}	
Central bank's participation in the primary market for Government Securities	P_{GC15}	
Formal statement of the objective(s) of monetary policy with an explicit prioritization in case of multiple objectives	P_{TA1}	*Central bank transparency and accountability (CBTA) - Pillar III-*
Quantification of the primary objective	P_{TA2}	
Explicit contracts between the monetary authority and the Government	P_{TA3}	
Publicly available economic data	P_{TA4}	
Disclosure of the macroeconomic model(s) for policy analyses	P_{TA5}	
Regular publishing of its own macroeconomic forecasts	P_{TA6}	
The prompt announcement of the monetary policy decisions	P_{TA7}	
Explaining and justifying the monetary policy decisions	P_{TA8}	

Quarterly evidence of the monetary policy direction	P_{TA9}	
Regularly evaluating the central bank's targets	P_{TA10}	
Regular information on macroeconomic disturbances that affect the policy transmission process	P_{TA11}	
Outcomes evaluating in the light of macroeconomic objectives	P_{TA12}	
Accountability of central bank Governor	P_{TA13}	
Auditing central bank activities	P_{TA14}	

The new index for central bank independence and inflation targeting has the foundations in *the need for credibility*, an important aspect in central banking that might be achieved through a high level of central bank independence. Independent central banks must be accountable for achieving monetary policy objectives. Some active mechanisms of the democratic central banking responsibilities for creating an autonomous central bank, for achieving its objectives and explain to the public the measures that have been taken must be set up. In this sense, a high degree of monetary policy transparency for the public monitoring of the monetary policy performances would be necessary (Dumiter, 2010).

The new index for measuring central bank independence and inflation targeting is conceived as a sum of numerical values assigned to thirty-eight institutional arrangements, both in law and practices of central banks: nine attributes to the first pillar - *political and legal central bank independence (PLCBI)*, fifteen attributes for the second pillar - *central bank governance and conduct of monetary policy (CBGCMP)* and fourteen attributes to the third pillar - *central bank transparency and accountability (CBTA)*. These three pillars take a maximum value of 10 each, and give a maximum aggregated value of 10 for the new index of central bank independence and inflation targeting. This index is better called a weighted index of central bank independence and inflation targeting, with a scale of 0-10, since the attributes are weighted unequally. The score assigned to each criterion is aggregated in order to obtain the final value of the index. The higher the value assigned to each criterion, the higher the maximum score of the index is (Dumiter, 2009).

The index for measuring central bank independence and inflation targeting was constructed and detailed by Dumiter (2009, 2010); variables and scoring are constructed and assigned by the author based on the empirical studies that have approached the problem of central bank independence and inflation targeting. This is not an expert base index and represents the author's opinion regarding the necessity of linking central bank independence to the inflation targeting. Our purpose is that through the new index, connecting central bank independence to inflation targeting via three channels: political and legal central bank independence, central bank governance and conduct of monetary policy, central bank transparency and accountability, we succeed to evaluate and assess more accurately the degree of central bank independence and the efficiency of the inflation targeting strategy both in the developed and the developing countries and to evaluate more precisely the effects of central bank independence on macroeconomic performance by statistical tools.

The technique of constructing this index is different from those of Cukierman (1992), Cukierman, Webb&Neyapti (1992), Arnone, Laurens, Segalotto, Sommer (2008) or Ilieva, Gregoriou and Tsitanis (2004); some of these indices are weighted by the importance of their criteria (Cukierman, 1992; Cukierman, Webb&Neyapti, 1992) – not all variables having the same importance; other are questionnaires and were scored by fulfilling or not the established criteria. Arnone, Laurens, Segalotto, Sommer (2008) use a standardized technique by dividing the absolute values by the maximum potential score, because they want to compare the results with other indicators like GMT or LVAU, LVAW.

The construction of the new index for measuring central bank independence and inflation targeting has a scale of 0 to 10 following the methodologies of Eijffinger Schalling (1993) (scale of 1 to 5), Bade&Parkin (1988) (scale 1 to 4), Grilli, Masciandaro&Tabellini (1991) (scale 0 to 8). The variables of the each pillar have the same weight, each of them having the same importance in the index construction; in order to normalize the index, the score of each pillar is divided by the number of the criteria in the respective pillar in order to have the same scale of 0-10. The maximum score of each criterion is consequently summarized and divided to the number of pillars in order to obtain the same scale of 0-10; this normalization is done in order to compare the score of each pillar with the overall score of the index.

This index is better considered both as a *de facto* and *de jure* index, because the aggregated value is based on the actual institutional practices or norms of central banks and not necessarily on what is written in the central bank laws. However, the new index for central bank independence and inflation targeting is an interpretation based on these laws, which are put into actual practices and those practices that are not in the law.

Table 2 summarizes the results of measuring central bank independence and inflation targeting in the developed countries, as well as the main correlation of the new index for central bank independence and inflation targeting and the macroeconomic performance. Countries at the top of the hierarchy in the developed countries group are: France (9.47 points), Ireland (9.17 points) and Spain (9.10 points). These countries have a high level of the three pillars of central bank independence and inflation targeting index, as well as the overall score due to some aspects such as: long-term tenures for the central bank Governor and the Members of the Board, very low turnover rates for the central bank Governor and non-political vulnerability, central bank authority in establishing monetary policy objectives, targets, interest rates, explicit interdiction of government lending and a high level of central bank transparency and accountability due to the permanent disclosure of the monetary policy process and the high degree of openness. These countries exhibit lower levels of inflation, high levels of output growth, and high levels of unemployment. Moreover, an inverse correlation between the index and the fiscal deficits and the current account balance can be observed (except the case of France, where central bank independence is positively correlated with the current account balance).

At the middle of the hierarchy of the developed countries are: Austria, Belgium, Canada, Denmark, Germany, the United Kingdom, Greece, Israel, Luxembourg, Malta, Sweden, Switzerland and the USA; the overall score of the index varies

between Israel (7.91 points – the lowest level) and Belgium (8.95 points – the highest level).

Table 2

Measuring Central Bank Independence and Inflation Targeting and Their Relationship with the Macroeconomic Performance in Developed Countries[1]

Country	P_{PL}[2]	P_{GC}[3]	P_{TA}[4]	I[5]	i[6]	o[7]	u[8]	fd[9]	cd[10]
Austria	6.00	9.33	8.93	8.09	3.22	2.69	3.91	-2.28	1.81
Belgium	8.55	9.00	9.29	8.95	2.80	3.54	7.75	-2.11	2.67
Canada	7.55	6.67	10.00	8.07	2.06	5.53	6.85	1.06	1.52
Denmark	8.88	7.80	8.93	8.54	2.94	2.56	3.70	3.69	2.04
France	9.44	9.33	9.64	9.47	3.15	3.20	9.17	-2.74	0.54
Germany	7.22	9.33	9.64	8.73	2.75	1.59	7.36	-1.72	2.72
United Kingdom	8.33	7.13	9.64	8.37	2.47	3.47	5.78	-1.98	-1.93
Greece	6.66	9.33	10.00	8.66	3.19	2.71	9.88	-7.23	-9.92
Ireland	8.55	9.33	9.64	9.17	2.78	3.80	5.84	-7.47	-5.18
Iceland	5.11	7.00	8.57	6.89	7.92	4.09	1.75	1.23	-11.28
Israel	5.11	9.33	9.29	7.91	4.88	3.65	7.51	-2.30	-1.77
Japan	4.33	4.33	5.71	4.79	1.39	- 1.19	4.33	-5.00	2.91
Luxembourg	8.88	9.00	8.93	8.94	2.21	8.41	3.64	2.08	8.02
Malta	6.55	9.33	9.29	8.39	3.48	2.14	6.45	-4.66	-4.43
Norway	6.11	5.00	9.64	6.92	3.05	1.91	2.88	-3.93	12.09
New Zealand	7.11	4.66	10.00	7.26	3.95	4.29	5.62	2.01	-7.37
Spain	8.33	9.33	9.64	9.10	3.18	4.74	13.48	-3.02	-6.25
Sweden	9.44	7.00	10.00	8.81	3.29	4.59	6.45	1.55	5.95
Switzerland	6.11	9.00	9.29	8.13	2.42	1.54	2.51	-0.20	6.67
USA	8.88	7.13	8.21	8.07	3.00	4.82	5.01	-5.38	-4.04

Notes: [1] Measuring central bank independence and inflation targeting in developed countries was made by analyzing central banks websites, government websites, central bank laws and statutes, different norms and regulations and other publications and studies available on the central banks websites and the real practices of the developed central banks in the period 1980-2009; the main macroeconomic indices were estimated by the author as the main average of each variable over the period 1999-2008 – the data used by the author is available on International Monetary Fund – World Economic Outlook Database 2010, International Financial Statistics and Government Financial Statistics, Econstats Database, Eurostat Database and United Nations Economic Commission for Europe.

[2] P_{PL} – Pillar I – Political and legal central bank independence.

[3] P_{GC} - Pillar II – Central bank governance and conduct of monetary policy.

[4] P_{TA} - Pillar III – Central bank transparency and accountability.

[5] I – Index for central bank independence and inflation targeting – overall score.

[6] i – inflation – average consumer prices – percent change.

[7] o – output – gross domestic product, constant prices – percent change.

[8] u – unemployment rate – percent of total labor force.

[9] fd – fiscal deficit – general government structural balance – percent of GDP.

[10] cd – current account balance – percent of GDP.

These central banks have members of the Governing Board appointed by Parliament, governors that do not hold any other office, price stability as the primary objective of the monetary policy, autonomy in establishing the interest rate and exchange rate mechanisms and higher levels of central bank transparency and accountability through the excellent functioning of the communication strategies.

These countries register lower levels of average inflation, high levels of economic growth and satisfactory levels of unemployment rates. The correlation between the index and fiscal deficit is negative (except the case of Canada, Denmark, Luxembourg and Sweden); a positive relationship between the index for central bank's independence and inflation targeting and current account balance can be identified (except the case of the United Kingdom, Greece, Israel, Malta and the USA).

At the bottom of the hierarchy of the developed countries group are: Iceland, Japan, Norway and New Zealand; the lower score registered by these countries was due to aspects such as: very high turnover rates of the central bank governors', political vulnerability, governance prevalence over central bank in case of policy conflicts and the participation of the central bank in the primary market of government securities. A very interesting aspect is regarding the third pillar of the index: New Zealand, Iceland and Norway exhibit high levels of this pillar due to the inflation targeting strategy adopted by the central banks, whereas Japan registers lack of central bank transparency and accountability by promoting banking secrecy. A positive correlation between the index for central bank independence and inflation targeting and output, inflation can be observed (except the case of Japan, where the index is inversely correlated); the impact of central bank independence and fiscal deficits in Japan and Norway is a negative one (positive in New Zealand and Iceland), and current account balance in Iceland and New Zealand is a negative one (positive in Japan and Norway).

Regarding the developed countries group, six countries adopted the inflation targeting strategy: Canada (1991), the United Kingdom (1992), New Zealand (1989), Sweden (1993), Norway (1993) and Iceland (2001). Other ten countries, namely Austria, Belgium, France, Germany, Greece, Ireland, Israel, Luxembourg, Malta, and Spain are members of the Euro Zone, which, through the European Central Bank promotes and *eclectic inflation targeting strategy*. This regime can be found in countries in which the trust within central bank is at a high level, so that price stability can be maintained without existing the statement on explicit intermediary objectives, through a high degree of transparency and accountability of the central banks; in the Euro Zone's case, because of a high degree of financial stability and low degree of inflation, the central bank is capable to offer, in a flexible manner, macroeconomic stability and a high level of employment. Denmark promotes a monetary policy that maintains a fixed exchange rate to the euro; this means that the monetary policy objective is maintaining a stable exchange rate policy. The formal framework of the fixed exchange rate is the Exchange Rate Mechanism II (ERM II). The USA has a monetary targeting strategy – the USA targets the monetary aggregates, more precisely the liabilities, the money costs and credit influence, as well as promoting the national economic objectives. The Switzerland's monetary policy is based on three elements: first, the central bank presents the way in which it defines price stability (the increase

in the National Price Consumer Index – CPI less than 2% per year); second, it substantiates the monetary policy decisions by a medium term prevision of inflation; third, it establishes a variation band of the operational target for the interest rate, namely the LIBOR rate over three months. In Japan, the Governor Council of the central bank takes the decisions over the current direction of monetary policy in the Monetary Policy Meetings; the Council discusses the financial and economic situation, then takes decisions over the future direction of the market's monetary operations in the Monetary Policy Meetings. The central bank publishes then in the *Monthly Bulletin over the Recent Financial and Economic Evolutions* the vision on the financial and economic trends, which is the base for the decisions of the market's monetary operations.

Table 3 summarizes the results of measuring central bank independence and inflation targeting in developing and emerging countries, as well as the main correlations of the new index for central bank independence and inflation targeting and the macroeconomic performances. The results show a classification split into two parts. The top of the sample is formed by countries such as: Albania, Bosnia-Herzegovina, Bulgaria, Estonia, Hungary, Latvia, FYR of Macedonia, Moldova, Poland, Romania; in these countries the index gains satisfactory levels due to: tenures of the central bank Governor and the Members of the Board that overlap the political business cycle, lower turnover rates of the central bank governors, central bank autonomy in establishing the monetary policy objectives, targets and instruments, freedom in managing the interest rate, and a high level in most of these countries of central bank transparency and accountability by adopting the inflation targeting monetary policy, through the public disclosure of monetary policy process and transmission mechanism and permanent communication with the public and financial markets. In these countries, a positive correlation between central bank independence and inflation, output (except Estonia) and unemployment rate can be observed, whereas regarding the other two indicators the situation is different: except Bosnia-Herzegovina, Bulgaria, Estonia and Moldova there is a negative relationship between central bank independence and fiscal deficit; there is a negative relationship between central bank independence and current account balance.

The bottom of the hierarchy of the emerging and developing countries group is represented by countries such as: Argentina, Armenia, Belarus, Brazil, Croatia, Lithuania, Russian Federation, Serbia, Turkey and Ukraine. The lower levels of the index registered by these countries have several reasons: short-term tenures of the central bank Governors and the Members of the Board, political vulnerability, multiple policy objectives without any prioritization, government prevalence over the central bank in case of policy conflicts, the availability of government lending.

Regarding the relationship between central bank independence and macroeconomic performances of the countries classified at the bottom of the hierarchy of the emerging and developing countries group a positive correlation between central bank independence and inflation, output (except the case of Serbia and Turkey) and unemployment rate can be noticed. Central bank independence is negatively linked both to fiscal deficit (except the case of Belarus and the Russian Federation) and current account balance (except the Russian Federation and Ukraine).

Following the emerging and developing countries group, nine countries adopted the inflation targeting strategy: Albania (2006), Armenia (2006), Brazil (1999), Hungary (2001), Moldova (2009), Poland (1999), Romania (2005), Serbia (2009), Turkey (2006); the Russian Federation is "on the way" of adopting a *fully fledged* inflation targeting; although currently it promotes an exchange rate targeting, the 2009-2011 strategy and the inflation target will finalize with the adoption of the inflation targeting strategy. Other countries promote the exchange rate targeting: Belarus (exchange rate targeting for assuring the ruble stability), Latvia, Lithuania, FYR of Macedonia (exchange rate targeting through a successful mix of monetary and fiscal policies, because of the export-import relationship dependence), Croatia, Estonia (since 1992 price stability was established through an exchange rate regime within a Monetary Policy Council), Argentina (the monetary policy regime adopted by the central bank is founded on risk management based on three pillars: equilibrium within the monetary market, anticyclical financial policy and managed floating of the exchange rate). Bosnia-Herzegovina is obliged to assure the aggregated volume of monetary liabilities, which should not exceed the equivalent in monetary terms of the Bosnia-Herzegovina foreign net exchange reserves. Starting on 1 July 1997, Bulgaria decided to introduce the Monetary Policy Council for stabilizing the national economy after the 1996-1997 important crisis. In this sense, Bulgaria joined Estonia and Lithuania, which adopted central bank anchoring over the ECU and USD in 1992, and 1994, and to some point Latvia, whose national currency is established on a fixed basket over the Special Drawing Rights (DST). In Ukraine, the monetary policy basic principles stand upon the criteria and economic indicators of the National Economic Development Program and the Ukraine's Major Economic Development Parameters over a certain period, the fiscal deficit and the financing sources, payment balance, all approved by the Ukraine's Cabinet of Ministries.

Table 3

Measuring Central Bank Independence and Inflation Targeting and Their Relationships with the Macroeconomic Performance in Emerging and Developing Countries[1]

Country	P_{PL}[2]	P_{GC}[3]	P_{TA}[4]	I[5]	i[6]	o[7]	u[8]	fd[9]	cd[10]
Albania	6.66	8.66	8.93	8.08	3.35	8.97	15.70	-4.19	-6.48
Argentina	4.44	7.40	5.71	5.85	3.70	1.68	13.22	-3.00	-1.34
Armenia	6.33	7.13	8.93	7.46	8.96	5.01	9.27	-0.69	-14.07
Belarus	6.33	5.00	7.14	6.16	154.28	6.68	2.00	0.34	-5.11
Bosnia – Herzegovina	9.44	7.66	5.36	7.49	5.10	7.45	23.40	1.80	-11.71
Bulgaria	6.66	6.13	6.79	6.53	7.26	4.14	12.76	0.76	-14.60
Brazil	3.00	4.13	8.57	5.23	5.26	5.13	9.43	-2.10	-3.02
Croatia	6.66	7.66	4.64	6.32	5.04	3.67	11.00	-2.87	-7.94
Estonia	7.11	8.00	6.79	7.30	6.83	-3.57	9.22	0.56	-6.83
Hungary	7.00	7.66	9.64	8.10	8.03	4.23	6.67	-5.95	-7.50
Latvia	8.88	7.00	5.36	7.08	8.69	6.89	10.75	-2.41	-10.98
Lithuania	7.44	7.66	4.64	6.58	6.29	6.12	8.72	-2.56	-11.40
FYR of Macedonia	8.88	7.33	7.50	7.90	8.27	4.57	34.29	-2.3	-7.88

Country	P_{PL}[2]	P_{GC}[3]	P_{TA}[4]	I[5]	i[6]	o[7]	u[8]	fd[9]	cd[10]
Moldova	8.88	7.33	8.93	8.38	25.98	2.21	7.37	0.67	-11.06
Poland	7.77	6.33	8.93	7.68	5.75	4.76	15.82	-4.53	-6.26
Romania	8.22	8.00	8.93	8.38	26.82	3.10	7.59	-2.68	-8.13
Russian Federation	5.55	5.33	8.57	6.48	49.92	5.98	7.77	5.63	9.36
Serbia	4.55	6.47	9.64	6.89	26.76	-2.81	13.60	-1.20	-17.52
Turkey	3.77	6.67	9.29	6.58	37.65	-3.36	9.45	-9.08	-5.65
Ukraine	6.00	4.33	4.64	4.99	23.96	2.10	5.27	-0.91	2.82

Notes: [1] Measuring central bank independence and inflation targeting in the emerging and developing countries was done by analyzing central banks' websites, government websites, central bank laws and statutes, different rules and regulations and other publications and studies available on the central banks websites and the real practices of the emerging and developing central banks in the period 1980-2009; the main macroeconomic indices were estimated by the author as the main average of each variable in the period 1999-2008 – the data used by the author is available at: International Monetary Fund – World Economic Outlook Database 2010, International Financial Statistics and Government Financial Statistics, Econstats Database, Eurostat Database and United Nations Economic Commission for Europe.

[2] P_{PL} – Pillar I – Political and legal central bank independence.

[3] P_{GC} - Pillar II – Central bank governance and conduct of monetary policy.

[4] P_{TA} - Pillar III – Central bank transparency and accountability.

[5] I – Index for central bank independence and inflation targeting – overall score.

[6] i – inflation – average consumer prices – percent change.

[7] o – output – gross domestic product, constant prices – percent change.

[8] u – unemployment rate – percent of total labor force.

[9] fd – fiscal deficit – general government structural balance – percent of GDP.

[10] cd – current account balance – percent of GDP.

IV. Developing a New Model for Estimating the Impact of Central Bank Independence on the Macroeconomic Performance

The empirical evidence regarding independent central banks' performance does not show that their activities are effective. In some cases, the soundness of the indices based on central banks' law interpretation regarding measuring central bank independence is controversial. In addition, the correlations between central bank independence and the macroeconomic performance are not always confirmed, the causal relation between central bank independence and inflation is controversial and the higher costs of the disinflationary process, as a result of a higher sacrifice ratio correlated with central bank independence, are also controversial.

The relationship between central bank independence and macroeconomic performance is focused on the empirical evidence on inflation, output or economic growth and the disinflation process costs. This situation is due to the reduced number

of studies regarding other financial indicators such as: interest rate, exchange rate or fiscal deficit. Moreover, specialists consider inflation and output as the main determinants and indicators of the social welfare level. Other empirical studies start from the hypothesis in which the central bank is seen as a "free lunch" organism. This hypothesis suggests that independent central banks will gain social benefits in terms of lower inflation rates, and without any real costs in terms of real macroeconomic performance as a lower output volatility or reduced economic growth.

Starting with the hypothesis that the monetary policy can generate effects in the real economy, one may see that central bank independence can lead to the improvement of macroeconomic performance by reducing the level and the variability of the inflation rate, increasing output, a decrease in the unemployment rate, and by reducing the budgetary and fiscal deficits. In our opinion, the degree of central bank independence must be an endogenous variable, because a historical analysis of the long-term institutional arrangements evolution must encompass problems bounded to the relation endogenity of monetary institutions and economic outcomes. The method that will be used is Poll Date-Two Stage Least Square (2SLS) and is used in order to determine the correlation between central bank independence and macroeconomic performance, in which the first stage of the variables of the model on the instrument will run separately for each equation.

In order to estimate the impact of central bank independence and macroeconomic performance, we have considered as necessary a Panel Data model, in which the independent variable will be central bank independence using the index for central bank independence and inflation targeting (all three pillars plus the overall score of the index) and as dependent variables the main macroeconomic indicators[3]: output, inflation, unemployment rate, fiscal deficit and current account balance; the model is tested for 20 developed countries[4] and 20 developing and emerging countries[5] the regression equations are the following:

$$GDPCP_{it} = \beta_1(PLCBI_{it}) + \varepsilon_{it} \quad (1.1)$$

$$GDPCP_{it} = \beta_2(CBGCMP_{it}) + \varepsilon_{it} \quad (1.2)$$

$$GDPCP_{it} = \beta_3(CBTA_{it}) + \varepsilon_{it} \quad (1.3)$$

$$GDPCP_{it} = \beta_4(ICBIIT_{it}) + \varepsilon_{it} \quad (1.4)$$

$$UNER_{it} = \beta_3(CBTA_{it}) + \varepsilon_{it} \quad (3.3)$$

$$UNER_{it} = \beta_4(ICBIIT_{it}) + \varepsilon_{it} \quad (3.4)$$

$$GGSB_{it} = \beta_1(PLCBI_{it}) + \varepsilon_{it} \quad (4.1)$$

$$GGSB_{it} = \beta_2(CBGCMP_{it}) + \varepsilon_{it} \quad (4.2)$$

[3] *The main macroeconomic indicators taken into account are:* inflation – average consumer prices – percent change, output – gross domestic product, constant prices – percent change, unemployment rate – percent of total labor force, fiscal deficit – general government structural balance – percent of GDP, current acount balance – percent of GDP.

[4] For the *developed countries group* we considered necessary the construction of a 20 representative countries sample as follows: Austria, Belgium, Canada, Denmark, France, Germany, the United Kingdom, Greece, Ireland, Iceland, Israel, Japan, Luxembourg, Malta, Norway, New Zealand, Spain, Sweden, Switzerland, and the USA.

[5] For the *developing and emerging countries group* we considered necessary the construction of a 20 representative countries sample as follows: Albania, Argentina, Armenia, Belarus, Bosnia-Herzegovina, Bulgaria, Brazil, Croatia, Estonia, Hungary, Latvia, Lithuania, FYR of Macedonia, Moldova, Poland, Romania, the Russian Federation, Serbia, Turkey, and Ukraine.

$$HPCIAP_{it} = \beta_1(PLCBI_{it}) + \varepsilon_{it} \quad (2.1)$$

$$HPCIAP_{it} = \beta_2(CBGCMP_{it}) + \varepsilon_{it} \quad (2.2)$$

$$HPCIAP_{it} = \beta_3(CBTA_{it}) + \varepsilon_{it} \quad (2.3)$$

$$HPCIAP_{it} = \beta_4(ICBIIT_{it}) + \varepsilon_{it} \quad (2.4)$$

$$UNER_{it} = \beta_1(PLCBI_{it}) + \varepsilon_{it} \quad (3.1)$$

$$UNER_{it} = \beta_2(CBGCMP_{it}) + \varepsilon_{it} \quad (3.2)$$

$$GGSB_{it} = \beta_3(CBTA_{it}) + \varepsilon_{it} \quad (4.3)$$

$$GGSB_{it} = \beta_4(ICBIIT_{it}) + \varepsilon_{it} \quad (4.4)$$

$$CAB_{it} = \beta_1(PLCBI_{it}) + \varepsilon_{it} \quad (5.1)$$

$$CAB_{it} = \beta_2(CBGCMP_{it}) + \varepsilon_{it} \quad (5.2)$$

$$CAB_{it} = \beta_3(CBTA_{it}) + \varepsilon_{it} \quad (5.3)$$

$$CAB_{it} = \beta_4(ICBIIT_{it}) + \varepsilon_{it} \quad (5.4)$$

where: *i* – state that is analyzed;

t – time period (2006-2008);

$GDPCP_{it}$ – gross domestic product, constant prices – percent change;

$HPCIAP_{it}$ – inflation – average harmonized consumer prices – percent change;

$UNER_{it}$ – unemployment rate – percent of labor force;

$GGSB_{it}$ – fiscal deficit – general government structural balance – percent of GDP;

CAB_{it} – current account balance – percent of GDP;

$PLCBI_{it}$ – political and legal central bank independence;

$CBGCMP_{it}$ – central bank governance and conduct of monetary policy;

$CBTA_{it}$ – central bank transparency and accountability;

$ICBIIT_{it}$ – index of central bank independence and inflation targeting – overall score;

ε_{it} – residual variable;

$\beta_1 ..... \beta_4$ – exogenous variable coefficients.

Our approach to make more full use of the structure of the data was by using the *seemingly unrelated regression (SUR)* framework initially proposed by Zellner (1962). We use this technique because one may identify that the requirement is to model several closely related variables over time. We have adopted the SUR technique because the dependent variables (output, inflation, unemployment rate, fiscal deficit and current account balance) may seem unrelated across the equation at first sight, but a more careful consideration allows us to conclude that they are in fact related after all. Thus, the central bank independence (represented by the new index – the three pillars and the total score of the index) is related to the macroeconomic performances (represented by output, inflation, unemployment rate, fiscal deficit and current account balance) since they are, to some extent, substitutes (if one of the three pillars is at some lower levels, we can switch to another pillar). The three pillars of the new index are also related because the total score of the index reflected in the macroeconomic performances will be affected by a set of common factors (adopting a new monetary policy strategy, changing the central bank's statute). The idea behind the SUR is essentially to transform the model so that the error terms become uncorrelated. In this sense, we do not adopt the *fixed effects models*, because they allow intercepting in the regression model to differ cross-sectionally but not over time, while all the slope estimates are fixed but cross-sectional over time. This approach is evidently more parsimonious that a SUR approach.

V. Econometric Results Referring to the Impact of the Central Bank Independence on the Macroeconomic Performance

For evaluating the impact of central bank independence on the macroeconomic performance, the sample was divided into developed and developing countries: for a more precise analysis, a time horizon of three years (2006-2008) was established because of the accuracy of the empirical results of the econometric testing, and a Pool Data model – Two – Stage Least Squares was used, estimated by using the Eviews5 program[6].

Table 4

Econometric Results Regarding the Impact of Central Bank Independence and Macroeconomic Performance in Developed Countries Group

Dependent variables: gross domestic product, constant prices – percent change – (o); inflation – average harmonized consumer prices – percent change (i); unemployment rate – percent of labor force – (u); fiscal deficit – general government structural balance – percent of GDP – (d); current account balance – percent of GDP – (a);					
Estimation method: Two Stage Least Squares (2SLS)					
Period: 2006-2008					
Explanatory variables	Dependent variables – developed countries group				
	o	i	u	d	a
PLCBI	0.380848 (0.128099)***	0.397131 (0.076081)***	0.745583 (0.039685)***	0.066344 (0.106789)**	-0.208324 (0.146515)***
GBCCMP	0.332930 (0.097818)***	0.385794 (0.065842)***	0.699546 (0.045665)***	0.115883 (0.102022)***	-0.071441 (0.110365)**
CBTA	0.283784 (0.077209)***	0.302326 (0.054121)***	0.596596 (0.041594)***	0.029425 (0.082505)**	-0.086449 (0.093981)**
ICBIIT	0.323941 (0.091742)***	0.347127 (0.063781)***	0.669398 (0.034621)***	0.074531 (0.094411)**	-0.087419 (0.110415)**
R-squared	0.277939	0.623799	0.931047	0.893505	0.940147
Adjusted R-squared	- 0.065040	0.445103	0.898294	0.842919	0.911717
S.E. of regression	1.867779	1.318750	0.740832	2.030380	3.004357
Durbin – Watson statistics	2.151756	2.973970	1.884026	1.957408	2.494217
Observations	240	240	240	240	240

*Note: The values of standard errors are in brackets; *, ** and *** mean statistical relationship significant at 10%, 5%, and 1%, respectively.*

[6] The economic data used for estimating the impact of central bank independence on developed and developing and emerging countries was constructed by the author using the information available in the following databases: International Monetary Fund – World Economic Outlook Database and Government Finance Statistics, Econstats, United Nations Economic Commission for Europe, EUROSTAT.

The econometric results presented in Table 4 highlight the positive correlation between central bank independence and output, inflation and unemployment rate in the developed countries group. The correlation between central bank independence and output reflects an insignificant relationship between these two variables (R^2 = 0.27) and a Durbin Watson Statistics test (DW = 2.15) around the optimal value; this situation might be explained that when increasing the degree of central bank independence, it cannot produce a significant shift regarding output in the developed countries group.

The relationship between central bank independence and inflation and unemployment rate suggest a significant correlation (R^2 = 0.62 in the first case and R^2 = 0.93 in the second case) and Durbin Watson Statistics test with undesirable values in the first case (DW=2.97) and desirable values in the second case (DW = 1.88); in these cases, the level of central bank independence will generate a positive increase in inflation and unemployment rate in the developed countries group.

Regarding the correlation between central bank independence and fiscal deficit in the developed countries, the econometric results show a negative correlation in countries such as: Austria, Belgium, France, Germany, Greece, Ireland, Israel, Japan, Malta, the United Kingdom and the USA, while for the remaining countries a positive correlation can be observed, with a high degree of correlation (R^2 = 0.89) and a Durbin Watson Statistics Test around the optimal values (DW = 1.95). These results show that except Japan (a country with a lower degree of central bank independence) the rest of the mentioned countries exhibit higher levels of central bank independence and negative levels of fiscal deficits.

Central bank independence is negatively correlated with the current account deficit in some developed countries, such as: France, Greece, Ireland, Iceland, Malta, the United Kingdom, New Zealand, Spain and the USA, while for the other countries central bank independence is positively correlated, having R^2 = 0.94 and a Durbin Watson Statistics Test with non-optimal values (DW = 2.49). These results show that countries with higher degree of central bank independence and that have adopted the inflation targeting strategy (except the case of the USA) will generate lower levels of current account balance.

Summarizing, one may observe that in the developed countries central bank independence generates increases in inflation, output and unemployment, while regarding the fiscal deficit and current account balance the central bank independence generates a decrease in these two variables.

Table 5 presents the results of the correlation between central bank independence and macroeconomic performances in the developing and emerging countries group. In compliance with the of the developed countries group, central bank independence is positively correlated with output, inflation and unemployment in the emerging and developing countries group. The relationship between central bank independence and output is insignificant (R^2 = 0.36), with Durbin Watson Statistics test around the optimal level (DW = 2.05); this shows that in countries with a lower or higher degree of central bank independence and that have adopted or not the inflation targeting strategy, central bank independence cannot be a significant factor to explain the output fluctuations. Regarding the correlation between central bank independence

and inflation and unemployment rate we can identify a positive significant correlation (R^2 = 0.62 and R^2 = 0.97) and Durbin Watson Statistics test with desirable values in case of inflation (DW = 2.12) and undesirable values in the case of unemployment rate (DW = 2.72). According to this finding, in the emerging and developing countries group central bank independence is linked positively with the inflation rate and unemployment rate.

Table 5

Econometric Results Regarding the Impact of Central Bank Independence on Macroeconomic Performance in the Developing and Emerging Countries Group

Dependent variables: gross domestic product, constant prices – percent change – (o); inflation – average harmonized consumer prices – percent change (i); unemployment rate – percent of labor force – (u); fiscal deficit – general government structural balance – percent of GDP – (d); current account balance – percent of GDP – (a);					
Estimation method: Two Stage Least Squares (2SLS)					
Period: 2006- 2008					
Explanatory variables	Dependent variables – developing and emerging countries group				
	o	i	u	d	a
PLCBI	0.985420 (0.182189)***	1.341989 (0.208902)***	1.629515 (0.071202)***	0.264869 (0.137709)***	-1.229535 (0.197916)***
CBGCMP	0.923271 (0.152620)***	1.126546 (0.205531)***	1.580642 (0.097418)***	0.208268 (0.134057)***	-1.217403 (0.195767)***
CBTA	0.872371 (0.161953)***	1.129060 (0.196481)***	1.619628 (0.062548)***	0.196236 (0.107703)***	-1.275384 (0.192178)***
ICBIIT	0.882133 (0.151222)***	1.151133 (0.187585)***	1.520263 (0.070272)***	0.221596 (0.123888)***	-1.209855 (0.188114)***
R-squared	0.365848	0.628794	0.978957	0.953329	0.869454
Adjusted R-squared	0.064626	0.452471	0.966841	0.931160	0.807445
S.E. of regression	3.143556	3.180298	1.494534	2.392211	3.282806
Durbin – Watson statistics	2.053358	2.125614	2.725239	2.545360	1.843043
Observations	240	240	240	240	240

*Note: The values of standard errors are in brackets; *, ** and *** mean statistic relationship significant at 10%, 5%, and 1%, respectively.*

In the developing and emerging countries group, the central bank independence is negatively correlated with fiscal deficits in countries such as: Argentina, Armenia, Belarus, Croatia, Latvia, Lithuania, FYR of Macedonia, Moldova, Romania, Turkey and Ukraine, with R^2 = 0.95 and a Durbin Watson Statistics Test with non-desirable values (DW = 2.54), while in the remaining countries the relationship is a positive one. Thus, most of these countries having a high degree of central bank independence and adopting inflation targeting can improve the macroeconomic performance in terms of negative fiscal deficits.

Regarding the correlation between central bank independence and current account deficit in the developing and emerging countries group, a majority of negative correlations between these two variables can be observed, with R^2 = 0.86 and a Durbin Watson Statistics test of 1.84. According to these findings, the higher the central bank independence is and with an inflation targeting strategy adopted, the emerging and developing countries can improve their macroeconomic performances in terms of lower current account deficits.

As one may see, the developed and emerging countries having an independent central bank will tend to increase output, but also the inflation and unemployment rate and decrease the level of fiscal deficits and current account deficits.

VI. Conclusions

The construction of the index for measuring central bank independence and inflation targeting has the rationale of eliminating the gap between *de jure* independence, measured with the help of legal indices, especially in the developed countries, and *de facto* independence, measured with the proxies: the turnover rate of central bank governor, political vulnerability of the central bank governor, especially in the developing and emerging countries. Moreover, the central bank independence is linked with inflation targeting regime by the importance of central bank governance, the correlation of the political with legal central bank independence and a high transparent and accountable central bank, all of these conducting to a credible monetary institution.

Central bank independence and inflation targeting was measured by the *index for central bank independence and inflation targeting,* based on some legal aspects and real practices of central banks; for a more comprehensive analysis two country groups were established: developed countries, and developing and emerging countries.

The results of measuring central bank independence and inflation targeting in the developed countries show a high degree of political and legal central bank independence: in these countries the Governor and the members of the Governing Board have long tenures and overlap the political cycles, the Governor and the Board members are non-political persons, turnover rates of the central bank Governors are very low (beneath 0.16) and it is a remarkably non-political vulnerability. Regarding the second pillar, the developed countries have a high degree of goal, target and instrument independence, autonomous central banks in establishing the interest and exchange rate policies and the strong interdiction of direct and indirect government lending. In these countries, the central banks are more transparent and accountable due to revealing the macroeconomic models and the economic data, explaining and justifying to the public and financial markets the monetary policy decisions and actions that need and are to be adopted, and to auditing of central bank activities.

In the developing and emerging countries, we can observe a satisfactory level of political and legal central bank independence, characterized on average by lower turnover rates, a small government interference in the appointment and dismissal procedures of the Governor and the Governing Board, but it can be also identified a political vulnerability in some of the developing countries. Central banks have a

relatively stable autonomy in establishing the monetary policies regarding the exchange rate and interest rate, in establishing the monetary policy targets in conjunction with the government, but also some weakness remarked by allowing government lending, by participating in the primary market for Government securities and performing the supervision function. Almost all of these countries have adopted an inflation targeting strategy, which has facilitated a better relationship with the public, media, private agents – all of these conducted to a high level of central bank transparency and accountability in the developing and emerging countries group.

The econometric testing of the impact of central bank independence and output in developed and developing and emerging countries show that it does not exist an important relationship between the growth rate and the degree of central bank independence. In other terms, the conclusion is the following: from a level the degree of central bank independence is falling down while the output level remains at the same level; this infirms an important causal relationship between central bank independence and the output growth in developed and developing and emerging countries.

The impact of central bank independence upon the inflation rate and unemployment rate is a positive one, both in developed and developing and emerging countries, situation that can be justified by the Philips curve in which governments need to accomplish a decrease in the unemployment rate and an increase in the income level, which will automatically lead to an increase in the inflation rate level. The main idea around central bank independence is that central banks with high levels of central bank independence are more capable to reduce the inflationary bias without having to implement completely inflexible rules.

Finally, the impact of central bank independence upon inflation can be explained by a third element: a strong inflation aversion. The monetary policy is conducted on the political interests; starting with this reason, both central bank independence and inflation rate are directly influenced due to the inflation aversion and the counter inflationary attitude enriched in the political interests. This attitude is fixed upon the financial intermediaries: the higher the opposition of the financial sector regarding inflation will be, the higher the degree of central bank independence will be.

Regarding the estimation of the central bank independence upon the fiscal deficit and the current account deficit in both developed and developing countries an inverse correlation between central bank independence and the two indicators can be observed. Moreover, an increase in the degree of central bank independence will automatically lead to a decrees in the fiscal deficits and current account balances levels in most of the analyzed countries.

Summarizing, we can observe developed countries such as: Canada, the United Kingdom, New Zealand, Sweden, Norway, Iceland, Austria, Belgium, France, Germany, Greece, Ireland, Israel, Luxembourg, Malta, Spain and emerging and developing countries such as: Albania, Armenia, Brazil, Hungary, Moldova, Poland, Romania, Serbia, and Turkey which register middle to higher levels of central bank independence and have adopted an inflation targeting strategy. Within these countries, the statistical data and the econometric tests suggest that increasing central

bank independence within an inflation targeting framework can be a stable path to improve the macroeconomic performance.

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