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Relation between Fiscal Rule and Select Economic Indicator of PIIGS Countries of Europe

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Abstract- The current European financial crisis is global in nature. Europe has its own special brand of institutional arrangements that are being tested in the extreme and which have exacerbated the financial crisis. The Europe fiscal rules were introduced at the supra-national level in 1992 in Maastricht treaty. These rules provide a permanent constraint on fiscal policy expressed in terms of a summary indicator of fiscal performance. Numerical fiscal rules specify numerical targets for key budgetary aggregates such as annual budget balance, expenditure, revenue, or debt. This paper adds to the literature through analysis of existence and nature of relationship between Fiscal Rule and Select Economic Indicator of PIIGS Countries of Europe using correlation analysis and regression analysis. It is now established that origin of Euro debt crises is in the Article 104c of the Maastricht Treaty (1992) regarding certain relaxation in convergence criteria. Most of the principle incorporated convergence criteriai.e.the "reference values" of 3 percent general government annual deficit limi t and 60 percent general government gross debt limit for the membership of the Eurozone has not been followed. The study shows that during last year debt to GDP ratio and current account to GDP ratio has been increasing. Further it is found that Portugal, Greece and Italy are very weak in comparison to Ireland and Spain.

Key words: Fiscal rules, Gross domestic product, Government Deb, Current account, fiscal rules index.

1. INTRODUCTION

The Eurozone crisis is ongoing from late 2009. It is a result of combined effect of government bed debt management system, banking crisis and competitiveness crisis. The consequence of global financial crisis is high Government debt in many developed economies including the United States (US), the United Kingdom (UK), Japan, France and global GDP contracted by 0.6 percent in 2009. This was the first global recession after the Second World War. The EU's GDP declined by 4.1%, Poland being the only Member State to record positive growth. The average unemployment rate in the EU rose from 6.1% in 2008 to 10% in 2010. However, the emerging economies did not suffered as much as the European and the advanced economies suffered

According to the (Andreas Dombre, 2011) the second half of 2011 was certainly not the good times for the Eurozone and for their financial stability. The financial crisis has now entered into a fourth stage. The *first s*tage was the subprime crisis which hit the US real estate market and also spread across the world. The *second* stage was the loss of confidence within the international financial system following the Lehman Brothers bankruptcy and the subsequent global economic crisis. The *third* stage has been the ongoing European sovereign debt crisis which began in Greece in May 2010. It was initially perceived as a problem of what was known as the "euro-area periphery". Now, in the fourth stage of the financial crisis, it has spread to the core of the euro area.

Jacob Funk Kirkegaard(2011) explained four principal aspects of the origin of euro area crisis, which are following:

(A) *A design crisis*: the euro area from its creation in the 1990 has lacked crucial institutions to ensure financial stability during a crisis .

(B) *A fiscal crisis*: was centered in Greece, has presence across the southern euro area Ireland;

(C) *A competitiveness crisis:* pre-crisis current account d eficits in the euro area periphery and

(D) *A banking crisis*: first visible in Ireland, but spreadin g throughout the euro area via accelerating concerns over sovereign   solvencies.

The Europe's currency union history   has   roots   in 1970(Werner Report1) and1989 (Delors Report2) and ultimately
The Maastricht Treaty(1992) in principle incorporated a convergence criteria   i.e. the "reference values" of 3 percent general government annua l deficit limit and 60 percent general government gross debt li mit   for   the   membership   of   the   Eurozone.   But Article 104c stated that countries could exceed the 3 percent d eficit target   and   60 percent gross debt   under   certain conditions.   This   treaty   has   certain additional Convergence Criteria. These were :First-inflation (within   1.5   percent   of the three EU countries with the lowest inflation rate), Secondlong-term interest rates (within 2 percent of the three l owest interest rates in the European Union), and   third exchange rate fluctuations (participation for two years in the E xchange   Rate Market II narrow band of exchange rate fluctuations).   These convergence criteria did not follow in providing the Eurozone membership e.g. in case of Italy and Belgium.

The euro area fiscal crisis is concentrated in Greece in which a general government debt exceeding 180 percent of GDP by 2012. The entry of Greece in the euro area and the adoption of euro in 2001 gave to the economy a reduction in interest rates never experienced before. Following the announcement of the Greek government in 1994 that it intended to take the necessary steps to fulfil the Maastricht treaty criteria in order to bring Greece in the euro area by 2001 the nominal interest rate on government bonds declined from about 20 per cent to 3 and a half percent in 2005. As the Greek financial crisis exploded in late 2009, interest rates began to rise substantially with the government bond yield increasing to almost 27 per cent at the beginning of November 2011. (Hardouvelis, 2011a,b).
Consequently, the cost of financing for Spain and Italy has als o risen substantially in recent   months with secondary 10year bond market yields currently between 5.5 and 6 percent.The Greek debt crisis that began in late 2009 was followed by respective fiscal and banking crisis in Ireland, Portugal, Spain and recently Italy.

In June, the ECOFIN Council announced that no euro area country was under an Excessive Deficit Procedure (EDP), while five countries in the euro area were under an EDP in 2006. The cyclical improvement of public finances and the reduction of interest charges allowed public balances to move away from the excessive deficits edge (Sterdyniak, H. (2010))

Exceptionally Germany straightaway introduced and implemented a series of reforms especially in labour markets and pension system. Subsequently, Europe's conventionally remained strongest and most competitive economy during the first decade of the euro area. It steadily pulled itself even further ahead from mostly all of the members of the EMU. Accordingly became the wide current account imbalances between North and south Europe. The Germany and other Northern members were running in surpluses. Whereas, especially the Southern (so called PIIGS countries- Portugal, Ireland, Italy, Greece, and Spain) peripheral members were running in deficits.

2. THEORETICAL   FRAMEWORK OF FISCAL RULE AND OTHER ECONOMIC INDICATORS

The Europe fiscal rules were introduced at the supra-national level with the 1992 Maastricht Treaty to established numerical entry criteria to the Economic and Monetary Union (EMU).These rules pose a permanent constraint on fiscal policy expressed in terms of a summary indicator of fiscal outcomes, such as the government budget balance, debt, expenditure, or revenue developments through budgetary discipline .However, fiscal rules can be beneficial along with appropriate institutions for monitoring and enforcement mechanisms and strong political commitment.

The dataset on domestic fiscal rules has been compiled by European Commission services since 1990 across EU countries directly from EU Member States. It covers all types of numerical fiscal rules (budget balance, debt, expenditure, and revenue rules) at all levels of government (central, regional, and local, general government, and social security). The information was collected in a survey, 2006 with annual updates scheduled since 2008. The latest available update to data is of 2012. The composite fiscal rules index is obtained by calculating the Fiscal Rule Strength Index (FRSI) taking into account five criteria (for each criteria rule score are given): (i) the statutory base of the rule, (ii) room for setting or revising its objectives, (iii) the body in charge of monitoring respect and enforcement of the rule, (iv) the

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enforcement mechanisms relating to the rule, and (v) the media visibility of the rule. The scores of the five criteria are first standardised to run between 0 and 1. The random weights are drawn from a uniform distribution between zero and one and then normalised to sum to one (Sutherland et al. 2005).

Table: 1 Distribution of numerical fiscal rules in the EU by fiscal aggregate targeted and design (Year 2005-2008)

Types of rule	Design					
Budget Balance rules	Golden rule

5 | Balanced budget rule

10 | Nominal ceiling

7 | Ceiling as a % of GDP

1 | Rules in structural terms

3 | Total

26 |
| Debt rules | Debt ceiling in Nominal terms

5 | Debt ceiling as a % of GDP

3 | Debt ceiling related to repayment capacity

8 | Other

2 | | 18 |
| Expenditure rules | Nominal expenditure

5 | Real

2 | Cap on nominal expenditure growth

4 | Cap on real expenditure growth

3 | Other

3 | 17 |
| Revenue rules | Tax burden as a % GDP

0 | Cap on tax rates

1 | Allocation of extra revenues

4 | Other

1 | | 06 |

Source: European Commission services

The positive effect in the short run might be disputed in periods of high debt. In the long run, taxes need to be raised or spending need to be cut to achieve the sustainability of public debt. The slowdown in real capital accumulation due to the increase in real interest rates can lower potential output growth (Elmendorf and Mankiw, 1999).

According to Romer (2006) the probability of sovereign default and the revenues to finance public debt depend on two elements. First, the probability of default depends on the difference of the real interest rate of public debt and the risk-free interest rate of the world. When the government is certain to repay its debt the interest rate equals the risk-free rate. As the probability of default rises, the interest rate the government must offer increases. It tends to infinity as the probability of default approaches unity. Second, the government might or might not collect sufficient revenues (primary surplus) to serve interest payments. If the value of the revenues is higher than the interest payments the probability of a default is zero. Otherwise, the default probability will approach unity.

3.   STATEMENT OF THE PROBLEM

After reviewing the literature it has been found that the wide current account imbalances between North and south Europe are result of the fiscal policy. The Germany and other Northern Europe members were running in surpluses and especially the Southern so called PIIGS countries(Portugal, Ireland, Italy, Greece, and Spain) peripheral members were running in deficits. Therefore, an endeavour has been made here to study the "*Relation between Fiscal Rule and Select Economic Indicator of PIIGS Countries of Europe".*

4.   RESEARCH METHODOLOGY

The present study is purely empirical research based on secondary data collected from the year 1990-2011 of Eurozone countries. The data has been collected on GDP, current account deficit, Government debt and fiscal rule index of all the Eurozone countries. The data has been analysed to check the relationship between fiscal rules and other economic indicators by using the correlation and linear regression techniques. The independent variable are fiscal rules index(X_1) and Euro currency (X_2, dummy variable where 0 is taken before 1999 and 1 after 1999) and variables GDP, Debt to GDP and Current Account to GDP have been taken as the dependent variables. The regression equations have been given below according to country wise. Where Y_1 means percentage of Gross Domestic Product, Y_2 means Debt to

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GDP ratio and Y_3 means Current Account to GDP ratio. The Standardised fiscal rules index from year 1990-2011 has been taken from European commission services and data of all the dependent variable has been taken from www.tradeeconomic.com.

5. FINDING AND DISCUSSION

The data has been analysed by applying Pearson Correlation and linear regression model. In the first half correlation results has been discussed and regression results in the second half.

Correlation results

Table No 2 shows Pearson correlation between fiscal rule index, GDP, debt/GDP and Current account/GDP of Portugal. A significant negative correlation has been found between fiscal rule index, GDP and Current Account to GDP. Over the period of time Portugal's fiscal rule index has been found negative but it has been moving towards fiscal discipline, by which their growth had been negatively affected. Consequently, their current account deficit increased. Similarly, a significant negative relation has been found between GDP and Debt to GDP. It means Government revenues decrease because of low growth rate and Govt. had to borrow.

Table No. 2 Correlation Matrix of Portugal

	Fiscal rule index	GDP	Debt/GDP	C.A./GDP
Fiscal rule index	1	-.589**	.868**	-.748**
GDP	-.589**	1	-.579**	.372
Debt/GDP	.868**	-.579**	1	-.820**
C.A./GDP	-.748**	.372	-.820**	1

*Significant at 0.05 level, ** Significant at 0.01 level

Table No 3 displays Pearson correlation between fiscal rule index, GDP, debt to GDP and Current account to GDP of Ireland. A negative correlation has been found between fiscal rule index, GDP and Debt to GDP. Whereas, significant

(-.648**) negative correlation has been established between fiscal rule index and Current Account to GDP. Fiscal rule index figures of Ireland are very similar to Portugal over the period of time. Consequently, their current account deficit deteriorated over the years. A significant positive relation has been found between GDP and current account to GDP. It reflects that as the GDP decreases/ increases their current account also decreases/increase.

Table No. 3 Correlation Matrix of Ireland

Ireland	Fiscal rule index	GDP	Debt/GDP	C.A./GDP
Fiscal rule index	1	-.384	-.380	-.648**
GDP	-.384	1	-.399	.606*
Debt/GDP	-.380	-.399	1	.414
C.A./GDP	-.648**	.606*	.414	1

*Significant at 0.05 level, ** Significant at 0.01 level

Table No 4 displays Pearson correlation between fiscal rule index, GDP, debt to GDP and Current account to GDP of Italy. A negative correlation has been found between fiscal rule index, GDP, Debt to GDP and current account to GDP but not significant. Whereas, A significant (0.494*) positive relation has been found between GDP and current account to GDP of Italy. It reflects that as the GDP decreases/ increases their current account also decreases/increase.

Table No. 4 Correlation Matrix of Italy

Italy	Fiscal rule index	GDP	Debt/GDP	C.A./GDP
Fiscal rule index	1	-.188	-.245	-.388
GDP	-.188	1	-.089	.449*
Debt/GDP	-.245	-.089	1	.322
C.A./GDP	-.388	.449*	.322	1

*Significant at 0.05 level, ** Significant at 0.01 level

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Table No 5 illustrates Pearson correlation between fiscal rule index, GDP, debt/GDP and Current account/GDP of Greece. Very surprisingly no relation has been found fiscal rule index, GDP and Current Account to GDP. It establishes the fact that Government of Greece had not followed any type of fiscal discipline. Therefore, a negative (-.662**) significant relation has been found between GDP and Debt to GDP. It means, Government revenues decrease because of low growth rate and Govt. borrowed through bond without any assessment.

Table No. 5 Correlation Matrix of Greece

*Significant at 0.05 level, ** Significant at 0.01 level

Table No 6 displays Pearson correlation between fiscal rule index, GDP, debt/GDP and Current account/GDP of Spain. A negative correlation has been found between fiscal rule index, GDP and Debt to GDP. Over the period of time Spain's fiscal rule index value has been found increasing and positive. It means that Spain is highly fiscally discipline among these five countries. A significant (-.687**) negative correlation has been found between fiscal rule index and current account to GDP. Whereas, positive significant (.448*) relation has been found between GDP and current account to GDP.

Table No. 6 Correlation Matrix of Spain

Spain	Fiscal rule index	GDP	Debt/GDP	C.A./GDP
Fiscal rule index	1	-.289	-.213	-.687**
GDP	-.289	1	-.071	.448*
Debt/GDP	-.213	-.071	1	.540**
C.A./GDP	-.687**	.448*	.540**	1

*Significant at 0.05 level, ** Significant at 0.01 level

B. Regression Analysis

In OLS regression technique the independent variable are fiscal rules index(X_1) and Euro currency (X_2, dummy variable where 0 is taken before 1999 and 1 after 1999) and variables GDP(Y_1), Debt to GDP (Y_2) and Current Account to GDP (Y_3) have been taken as the dependent variables. For estimating the relationship between independent and dependent variables following functions were specified whose results are given below country wise:

In case of Portugal:

$$Y_1 = -2.475 - 5.258X_1 + 0.405X_2 \qquad \text{Eq.-(1)}$$

$$Y_2 = 86.307 + 52.468X_1 + 12.225X_2 \qquad \text{Eq.-(2)}$$

$$Y_3 = -3.789 - 2.320X_1 - 7.154X_2 \qquad \text{Eq.-(3)}$$

The equation (2) has been found significant at one

Greece	Fiscal rule index	GDP	Debt/GDP	C.A./GDP
Fiscal rule index	.a	.a	.a	.a
GDP	.a	1	-.693**	.494*
Debt/GDP	.a	-.693**	1	-.662**
C.A./GDP	.a	.494*	-.662**	1

percent level where the p-value is 0.000 and similarly equation (3) has p-value= 0.000. The results show that in both case fiscal rule index has a significant positive effect on Debt to GDP and Current account to GDP. The debt to GDP is highly dependent on fiscal rule are depending on fiscal rules..Portugal recorded a -10.4 and -12.6 percent Current Account deficit of the country's Gross Domestic Product in 2011 and 2009 respectively and highest of 0.3 Percent in 1990. At the front of debt obligation the situation was very alarming as it recorded highest Debt to GDP ratio i.e. 107.8 percent in 2011and lowest 23.8 percent in 1990.Therefore, it is now established that Portugal ignored the fiscal rule and found highly indiscipline.

In case of Ireland

$$Y_1 = -3.193 - 3.130X_1 + 2.984X_2 \qquad \text{Eq.-(4)}$$

$$Y_2 = 94.768 + 20.422X_1 - 41.328X_2 \qquad \text{Eq.-(5)}$$

$$Y_3 = -5.410 - 6.927X_1 - 1.518X_2 \qquad \text{Eq.-(6)}$$

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The equation (5) has been found significant at one percent level where the p-value is 0.002 and similarly equation (6) has p-value= 0.003. The results show that fiscal rule index has a significant positive effect on Debt to GDP with estimated coefficient 20.422 and negative effect on Current account to GDP with estimated coefficient -6.927. The debt to GDP is highly dependent on fiscal rule are depending on fiscal rules. Therefore, Government should not ignore the fiscal discipline. Ireland recorded a Current Account surplus of 1.1 percent of the country's Gross Domestic Product in 2011. From 1990 until 2011, Ireland recorded highest current account of GDP i.e. 4.0 Percent in 1994 and lowest -5.7 Percent in 2008. Ireland recorded highest Debt to GDP ratio 106.5 percent in 2011 and record low in 2007 i.e. 19.8 percent.

In case of Italy,

$$Y_1 = 1.219 - 0.210\ X_1 + 0.551 X_2 \qquad \text{Eq.-(7)}$$

$$Y_2 = 87.519 - 23.129 X_1 + 12.585\ X_2 \qquad \text{Eq.-(8)}$$

$$Y_3 = -3.623 - 3.748 X_1 + 1.096 X_2 \qquad \text{Eq.-(9)}$$

No significant relation has been found of fiscal rule index because it not fiscally disciplined (See table No.7).at the front of trade account the health of the Italy was not good in comparison to Ireland. Highest Current Account deficit of the country's Gross Domestic Product i.e. 3.2percent found in 1997 and lowest -3.5 percent in 2011 in between 1990 to 2011. Italy recorded highest Debt to GDP ratio i.e. 120.1 percent in 1994, 2011 and lowest 96.3 percent in 1990. On the basis of the fact it can be concluded that Italy never fulfilled the convergence criteria, still it become the member of the Euro Area.

In case of Greece,

$$Y_1 = 1.744 - 0.068 X_2 \qquad \text{Eq.-(10)}$$

$$Y_2 = 100.044 + 16.494\ X_2 \qquad \text{Eq.-(11)}$$

$$Y_3 = -2.311 - 6.835 X_2 \qquad \text{Eq.-(12)}$$

No significant relation has been found of fiscal rule index because it was not disciplined (See table No.7).

Greece recorded a Current Account deficit of -12.8 percent of the country's Gross Domestic Product in 2011. Greece never recorded surplus Current Account to GDP between 1990 to 2011 and recorded lowest -18 Percent in 2009. Greece recorded Debt to GDP ratio165.4 percent of the country's Gross Domestic Product in 2011 as an increasing trend since 1990.Greece documented lowest Debt to GDP ratio i.e. 89.1 percent in 1990. This ratio is usually used by the investors to measure a country ability to make future payments on its debt. On this basis it can be concluded that this country is very weak country.

In case of Spain:

$$Y_1 = 2.188 - 1.327 X_1 + 1.928\ X_2 \qquad \text{Eq.-(13)}$$

$$Y_2 = 44.7 - 2.598 X_1 + 1.504\ X_2 \qquad \text{Eq.-(14)}$$

$$Y_3 = -2.142 - 1.521 X_1 - 1.178\ X_2 \qquad \text{Eq.-(15)}$$

The equation (15) has been found significant at one percent level where the p-value is 0.002 with -1.521 coefficient value. The fiscal rule index has a significant negative positive effect on Current account to GDP. The results established that Spain is highly fiscal disciplined among the group. It is the victim of Euro effect and of global effect. Spain recorded a Current Account deficit of -4.4 percent of the country's Gross Domestic Product in 2011. From 1990 until 2011Spainnever shown surplus Current Account to GDP ratio and lowest -10 Percent in 2008. The Debt to GDP ratio was highest in 2011 i.e. 69.1 percent of the country's Gross Domestic Product and lowest 29.2 percent in 2007. On the basis of these facts it can be concluded that it is not a weak country.

CONCLUSION

It is now established that origin of Euro debt crises is in the Article 104c of the Maastricht Treaty(1992) regarding certain relaxation in convergence criteria. Most of the principle incorporated convergence criteria i.e, the "reference values" of 3 percent general government annual deficit limit and 60 percent general government gross d ebt limit for the membership of the Eurozone has not been followed. The study shows that during last year debt to GDP ratio and current account to GDP ratio has been increasing. Further it is found that Portugal, Greece and Italy are very weak in comparison to Ireland and Spain.

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ANNEXURE

Table No. 7 Standardised fiscal rules index from (1990-2011)											
Country	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Greece	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02
Spain	-0.21	1.62	1.88	1.88	1.88	1.70	1.70	1.70	1.70	1.70	2.05
Ireland	-0.99	-0.99	-0.99	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64
Italy	-0.26	-0.26	-0.26	-0.26	-0.26	-0.26	-0.39	-0.40	-0.38	-0.34	-0.33
Portugal	-1.02	-0.65	-0.47	-0.47	-0.47	-0.47	-0.43	-0.43	-0.43	-0.43	-0.43

Table No. 7 Standardised fiscal rules index from (1990-2011)											
Country	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Greece	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02
Spain	-0.21	-0.21	-0.21	-0.21	-0.21	-0.21	-0.21	-0.21	-0.21	-0.21	-0.21
Ireland	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-0.99
Italy	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-0.49	-0.49
Portugal	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02	-1.02

Source: European Commission:- Directorate-General for Economic and Financial Affairs

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