

## **A Study of Economic Linkages between a Nation and a Trade Bloc: a Greece Perspective**

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**Abstract:** *The focus of the paper is to study the economic linkages between a nation and a trade bloc. An attempt has been made to study the fundamental problem of European Union as a whole by taking Greece crisis as an example. In the current study, time series analysis has been used and Granger- causality test has been performed on seven different variables viz. balance of payments, central government debt, FDI, GDP growth rate, inflation rate, savings rate and unemployment rate, from 1991 till 2014. The evidence of ADF, ANOVA, co-integration and Granger causality has been shown in the result section. The study reveals the fundamental problem of Eurozone, i.e. its centralized monetary and a decentralized fiscal policy. The paper also attempts to bring out the options in front of Greece to overcome the crisis.*

**Keywords:** *Austerity, Causality, Debt, European Union, Eurozone, Fiscal and Monetary Policies, Fiscal Deficit, Greece Crisis, Grexit, Maastricht Treaty*

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### **I. Introduction**

#### **1.1 Currency Unions in Theory and Practice**

When two or more nations come together with a common currency, then they form a currency union. The theory of Optimal Currency Area (OCA) given by prof. R.A. Mundell states currency area as “a geographical region, which would maximize economic efficiency, while also creating the conditions of trade openness and mobility that determine which regions within the union should share a common currency in general.” European Union is a formal- common policy type of a currency union. It also has a common monetary policy and a monetary authority. The following paper presents the case of European Union, which is a currency union, and its member country Greece, which is in a crisis. The paper attempts to study the relation between a trade bloc (a formal currency union in this case) and a crisis led member nation (Greece).

#### **1.2 Evolution of European Union as a Trade Bloc**

The European Union, that we see today, is a geo- political entity, which is spread across the continent of Europe. It began with six founder members. Today, its member states have increased to twenty- eight. After the end of Second World War in 1945, the ECSC (European Coal and Steel Community) started uniting European countries in order to maintain economic and political peace and stability. In 1950, it came up with six founder members: France, Belgium, Italy, Germany, Netherlands and Luxembourg. 1950s witnessed cold wars between East and the West. This was the time when there was widespread of communism, rebellion wars against the same. In 1957, the Treaty of Rome was signed, and the European Economic Community was formed. This was a common market of Europe. This was a peaceful beginning of cooperation. The countries stopped charging custom duties while trading with each other. They also agreed to have joint control over food production. The purpose behind this was that everybody gets enough to eat. This led to surplus in agricultural production later.

United Kingdom, Ireland and Denmark joined EEC (European Economic Community) in 1973. The oil crisis of 1973 caused economic crisis and energy crisis in Europe. In 1974-75, the last right- wing of dictatorship came to an end. Huge amount of money was transferred for job creation and infrastructure development in poorer areas. The era also witnessed its first election, where citizens elected their members directly. This was an increasing influence of European Parliament of European Economic Community’s affairs.

In 1981, Greece entered the European Economic Community. It became the tenth member of the European Economic Community. Portugal and Spain also joined the EEC five years later. In 1986, ‘the Single European Act’ was signed. This treaty was the stepping stone for the formation of ‘Single Market’ of Europe. This was the time of the fall of the Berlin Wall. In October 1990, East and West Germany were reunified for the first time after twenty eight years.

The decade of 1990s led to collapse of communism. On 7th February 1992, the Maastricht treaty of European Union was signed in Netherlands, and was implemented in 1993. In 1993, with the completion of single market, there was now free movement of goods, services, people and money. Sweden, Finland and Austria also joined the Union in 1995. Schengen agreement was signed in 1985, but was actually implemented in 1995. It gradually allowed people to travel freely across the region, without having their passports checked at

borders along with harmonization in the Visa policies. Education, communication, became more profound. In 1999, the treaty of Amsterdam was signed. Soon in the beginning of 21st century, the European Union members adopted Euro as a common currency and formed a common or say centralized monetary policy. After the 9/11 terror in New York and Washington, EU countries began working together to fight against crime. By 2007, twelve new countries joined the union, when the political tensions between East and the West came to an end. September 2008 witnessed global financial crisis. This crisis led to closer economic cooperation among the EU members. The treaty of Lisbon was also brought into force on 1st of December 2009, which provided the EU members with more efficient working methods and modern institutions. The new decade of twenty first century began with severe economic crisis, which affected various member- nations of the European Union. At the same time, they invested in climate friendly- green technologies, hoping for a long lasting welfare and growth.

### **1.3 Greece Crisis**

Greece, which was considered as one of the poor countries, joined the European Economic Commission in 1981. When it joined, its debt to GDP ratio was higher than the permissible level of 60%, so it was kept under observation by Goldman Sachs. With the formation of Euro as a currency, Greece entered the Eurozone in 2001. Eurozone led to the formation of a common monetary policy for its members. The problem with European Union is that it has a centralized monetary policy, but a decentralized fiscal policy. Under the gold standard, money had the tendency to adjust automatically. This mechanism is absent under the Euro Zone.

Greece crisis is an ongoing crisis in the world economy, which got worsened because of the global economic slowdown of 2007-08. Goldman Sachs, the investment bank, which was monitoring Greece for its debt- to- GDP ratio, also played a very important role in worsening the condition of Greece. It gave a secret loan of \$2.8 billion to Greece and entered into swaps, which improved the fiscal deficit of Greece by 2%. But in reality, this was not so. This issue came up quiet late, but by that time, Greece was already under huge amount of debt.

Goldman Sachs took a premium fees of 300 billion \$ and earned a lot by investing it back in the New York Stock Exchange. On the other hand, Greece found it difficult to repay its debt. The debt of Greece, which was already very high, has to now repay back to Goldman Sachs as well, at a very high interest rate. Thus the condition of Greece worsened. As of 2014, the debt to GDP ratio in Greece was 177%, which according to the clause of EEC, should not exceed 60%.

When Greece entered into the swaps, by then it had already joined Eurozone. It entered into swaps in order to reduce its debt to GDP ratio (clause of Maastricht treaty). The swaps were used by many of the European Governments to meet the terms of the Maastricht treaty. The swaps were executed in accordance with Eurostat rules. But the debt to GDP ratio of Greece kept increasing. It was not able to repay its debts. Instead, it violated the clauses of Stability pact and Maastricht treaty. Decentralized fiscal and centralized monetary policy was one of the reasons which led to this situation of Greece. Alone fiscal policy can't help Greece to come out of the crisis. Monetary policy also has to come in. But if the European Central Bank changes its monetary policy, it would affect not only Greece, but all the nations of the Euro Zone. And only with the help of fiscal policies, Greece might end up into even worse situation of stagflation. With the outfall of the economic slowdown of 2007-08, the inflation rate of Greece started to fall, and the unemployment rate started to raise, both at a very high rate. In 2012-13, the inflation rate was in negative terms. Youth unemployment especially, started to grow at a very rapid rate, and in 2012-13, it was between 70-80%.

The Greece crisis is having adverse consequences, which include high level of poverty (44% n 2014), high level of migration, high unemployment rate (27%), low inflation rate (-1.8%), loss of trade, loss of GDP (which fell by 26% between 2007 to 2014), social deregulations, political turmoil (elections took place five times in past eight years), and heavy dependence on others. Recently, IMF also came into the picture. Greece is now on the verge of recapitalizing its banks, and privatizing it, so that it earns money from it. Along with this, it is also privatizing its airports. It is ought to follow the austerity measures and the guidelines given by IMF and European Central Bank. There is a need for Greece and its bankers to link its loan repayment to its economic growth. The following paper is an empirical analysis of the same. The Greece Government now a day, along with following the austerity norms, is also taking other measures like privatizing its airports, recapitalizing and privatizing its banks. These measures can bring in money in the economy of Greece, which can help the economy of Greece to come back to normal.

### **1.4 Early Attempts to Solve the Crisis**

Till date, various attempts have been taken by the ECB, IMF and other bodies to help Greece get out of the crisis. Various austerity measures have been adopted by the Government of Greece in order to get out of the crisis. But instead of betterment of the situation, these led to various mob invasions, and political turmoil in the nation. The nation witnessed nine elections in five years. Bailouts were also given by IMF and ECB, but Greece is most likely to default on its loans as well. The first bailout (loan) was given to Greece in May 2010 by the

European Commission. This accounted for 80 Billion Euros. Slovakia did not participate in this loan agreement. Ireland and Portugal also stepped down from this as they themselves wanted the loan. So the loan amount was reduced by 2.7 Billion Euros. The second bailout package was given to Greece by IMF and the Euro area member states. This was an amount of 130 Billion Euros. But with the introduction of European Financial Stability Facility in August 2010, the actual bailout given to Greece during 2012-14 was 164.5 Billion Euros, in which 144.7 Billion Euro was given by Euro area members via EFSF. Bonds worth 197 Billion Euro were exchanged for this. In July- August 2015, third package of austerity was introduced. 246 Billion Euro was bailed out to Greece in order to get Greece out of the crisis. But these bailouts and austerity itself are not sufficient for Greece to get out of the crisis. Only fiscal and monetary measures together can bring about stability in Greece.

### 1.5 Allocation of Bailout Money

After three bailout packages and various rounds of austerity reforms, the economy of Greece is hardly recovering. The table below has been taken from an OECD report of 2015, which shows where the aid given to Greece goes. The table shows financial aid allocation of third bailout package only.

**Table I:** Where did the Greek Aid Go

Debt Servicing	Maturing Debt	81.3 Billion Euros
	Interest Payments	40.6 Billion Euros
	IMF repayments	9.1 Billion Euros
Financial Programs	Recapitalization of Greek Banks	48.2 Billion Euros
	Cash for commercial banks that had taken losses on Greek debt	34.6 Billion Euros
	Buying back Greek sovereign bonds	11.3 Billion Euros
Government Spending	Deficit	15.3 Billion Euros
	Other Cash Needs	11.7 Billion Euros
	Participation by Greece in the financial assistance to other Euro countries in crisis	2.3 Billion Euros

*Source: OECD Report*

The bailout money was spent mostly to repay the debt. Ideally, the Government of Greece should have spent the money on public expenditure like health, education. Instead, it used a major chunk of this bailout money to repay its debts. Take the case of Ireland, which had no fiscal rescue available when the bubble burst there in late 2006. Instead of waiting for external help, Ireland underwent devaluation by cutting wages, which made the Irish economy competitive again. Ireland too got fiscal aid, but towards the end of 2010. Ireland then stopped its internal devaluation almost immediately. By 2015, its GDP surpassed the pre- crisis level. The point to be noted here is that Greece should also learn a lesson from Ireland. Both are members of Eurozone and EU. Both underwent financial crisis. But only one managed to surpass the crisis by tightening its belt, whereas the other still have to undergo various reform measures and will need external help in order to overcome the crisis.

### 1.6 Importance of Fiscal Policy in Eurozone Maintenance.

Fiscal policy is defined as the spending policies of the Government that influences macroeconomic indicators, such as budget, tax structure, etc., in order to limit public expenditures and control the economy. Fiscal policy plays an important role in a nation's growth and development. But fiscal policy alone can't move mountains. For the purpose, monetary policy also has to come along. In case of Greece and other Eurozone member nations, monetary policy and fiscal policy does not move together. Monetary policy of the Eurozone is centralized and is under the control of European Central Bank. At the same time, the fiscal policy remains decentralized. That is, every nation has a common monetary policy, but different fiscal policies. Trying to integrate an individual Eurozone member nation's fiscal policies was, and still is, a very sensitive subject area because it reduces national sovereignty.

The signing of Maastricht treaty in 1992 paved ways for the creation of Euro as a common currency. By this, the government deficit and the debt to GDP ratio had to be limited to 3% and 60% respectively. In 1997, The Stability and Growth Pact was signed among the member states of the European Union, who agreed "to strengthen the monitoring and coordination of national fiscal and economic policies", so as to enforce the limits of both, government deficit and debt to GDP ratio. The pact ensured that the member states pursue a sound public finance and coordinate their fiscal policies.

The pact was signed to ensure budgetary discipline among the member states, and to prevent economic instability in the Union. The Euro- plus pact originated at the height of the crisis as one of the measures to stabilize the Euro area. The pact was constructed as an attempt to incentivize increased implementation of structural reforms by each participating EU member state, to improve their performance within the focus areas of the pact, which were:

- Increase competitiveness
- Increase employment

- To contribute to sustainability of public finances
- Reinforcing financial stability
- Coordinating tax policy

The Euro plus pact was adopted under the Open method of coordination, which is a new intergovernmental means of governance in the European Union. It is based on voluntary cooperation of its member states. Thus, we can see how important the role of fiscal policy in any nation's development is. In the context of Greece, integrating fiscal and monetary policies are very sensitive but crucial for the betterment of the nation and the trade bloc as a whole.

## **II. Objective and Scope of the Study**

European Union is a classic example of an economic union. But it has a flaw. It has a centralized monetary and a decentralized fiscal policy, because of which, many weak economies broke down during the 2007- 08 global economic slowdown. The economies included that of Portugal, Ireland, Italy, Greece and Spain, popularly known as the PIIGS nations. The objective of the paper is to study the Greece crisis using Granger causality (econometric tool). The paper also attempts to investigate the relationship between a trade bloc and a nation by taking the example of Greece crisis, and study the impact of trade bloc (European Union) on a nation (Greece). Using Granger causality test, attempt has also been made to study the various probable options in front of Greece to overcome the crisis.

## **III. Literature Review**

In this section, we will review how researchers in the past have tried to examine the problem of EU as a trade bloc, and their opinions on Greece crisis. By reviewing literatures, we will be able to know various variables used by the researchers in order to gauge the link between Greece as a member nation of European Union.

Michaelides, Milios, Vouldis and Lapatsioras (2009) wrote a paper on "Business Cycles in Greece (1960-08): An Econometric Investigation". It published in the Journal of Economics and Business. The time period for the analysis was from 1960 to 2008. It was written to analyze the principal macroeconomic series of business cycle in Greece using econometric tools. Concepts of deviation cycle, augmented dickey fuller test, periodograms (indicates length of the cycle) and spectral analysis has been used by the authors to reach to the conclusion. The authors conclude that strong cyclical regularities were there. This finding is also consistent with the findings of other researchers, relating to the development of the economy of Greece.

Later, Arghyrou and Kontonikas (2010) wrote "The EMU Sovereign- debt crisis: fundamentals, expectations and contagion". They took data with monthly frequency for ten years (1999-2010) and used time series estimation and panel estimation to model the bond spread against Germany in the pre- crisis period and the post crisis period. They found out the following:

- The markets did not price macro fundamentals and international risk conditions in the pre- crisis period.
- On a country by country basis, markets had been pricing both factors during the crisis period.
- Due to the unfavorable shift in market expectations, the Greek debt crisis escalated in November 2009. It further deteriorated the macro- economic performance of the nation.
- Till the time of the analysis (February 2010), EMU countries like Portugal, Ireland and Spain had also experienced this contagion from Greece.

Their findings support the convergence trade hypotheses. According to this hypothesis, 'the markets discount only the best case scenario of the full convergence to German fundamentals, even for countries displaying a clear deterioration of their macro- fundamentals.' They also recommended privatizing its industries can be beneficial for Greece to recover from the crisis.

Dimitrios (2011) wrote on "The Determinants of National Debt: Evidence from the Greece Economy in the Last Decade". The author in the paper attempts to study the relation between intra EU trade balance and extra EY trade balance along with long term rate of interest on govt bonds. The author examined these using Granger causality and VAR. The results form GC and VAR also establish the same results, i.e. debt is granger caused by debt, deficits, interest rates and intra- extra EU trade balance.

Lyrantzis (2011) wrote a paper "Greek Politics in the Era of Economic Crisis: reassessing Causes and Effects", where he spoke about the reasons about why the economy of Greece broke down. There was political mismanagement in the economy of Greece. High level of corruption and economic instability because of high fiscal deficits and low current account deficits caused political and socio- economic breakdown of the economy in the 2008-09. Along with the economic crisis, Greek is also undergoing political turmoil and breakdown, which is also a reason for the crisis happening in the Greek economy.

Monastirirotis (2011) wrote a paper on "The Greek Crisis in Focus: Austerity, Recessions and Paths to Recovery". The paper basically speaks about the austerity measures taken by the Government of Greece and if it is actually helping the economy of Greece to overcome the crisis or not. Because of the crisis, there was a

significant amount of gender inequality and poverty, which had increased. In the paper, the author speaks about two things. Increase in austerity on the one hand would reduce fiscal deficit. On the other hand, austerity gives rise to greater and greater recession (or depression). As the monetary policy is centrally controlled by the European Union directly, and the member states can control their affairs through fiscal policies only, thus Greece was also left with only option of fiscal regulation. Austerity included, or the fiscal consolidation included cutting down the spending and increasing the tax rate for the public. This can further lead to stagflation, which is even worse than the condition of depression or recession. This depression became more severe because there was no growth in the economic system, and decision taking was delayed a lot, leading to even worse situations.

Betyak (2012) wrote a paper “An Econometric Analysis of Determinants of Economic Growth in Crisis Countries of European Union” in which he attempted to measure the impact of macroeconomic variables on the GDP growth of PIIGS countries (Portugal, Ireland, Italy, Greece and Spain) of the European Union. Along with the GDP growth, the author has also taken into account trade openness, investment rate, savings rate and inflation rate. The author has also analyzed the pre and post crisis periods for variables like saving rate, investment rate, unemployment rate, GDP growth rate, rate of unemployment, inflation rate and debt to GDP ratio. The author has also given a few policy recommendations from his side. The author from his econometric findings comes up with results for the entire five crises hit countries. From the comparative data analysis of the five countries, he concludes that no improvement can be seen in the pre and post crisis period, in the macroeconomic performances.

Another paper “The Greek Sovereign Debt Crisis: A Conceptual and Empirical Analysis”, was published in IJIEI’s July- December volume in 2012. It was written by Miguel D. Ramirez and Rachamenhem of Trinity College (Hartford, CT). The paper presents the ongoing currency crisis in Greece, disguised as the Greek sovereign debt crisis. The results indicate that bond spread was penalized due to poor economic fundamentals and international risks during the crisis period. This effect was not seen in the pre- crisis period. The authors examined the effects of austerity measures by ECB and IMF on Greece. They concluded that these measures would worsen the economy of Greece, which is already under high debt and is suffering from a weak economic fundamental.

Puig and Rivero (2012) wrote on “Granger- Causality in peripheral EMU public debt markets: A dynamic approach”. In the paper, the authors came up with a dynamic GC to analyze the peripheral EMU sovereign yield behavior (on 10 year bond yields) among the PIIGS nations. The author has also examined the time varying nature of this using Granger-causality in order to detect increasing causality among these. The author also examined the determinants and variables which caused the same.

Nikiforos, Carvalho and Schoder (2013) published their working paper at the Levi Economics Institute. The paper was “Foreign and Public Deficits in Greece: In Search of Causality”. In the paper, the authors have discussed over the trajectories of public deficit and sovereign debt of Greece over a period of three decades, from 1980 to 2010. They have tried to show causality between foreign debt and public debt, and argued that between 1980 and 1995, there was causality from public deficit to foreign deficit, which got reversed after the European monetary unification process. Using Granger Causality and Co- integration VAR analysis, they have tested and verified their hypothesis econometrically. After analyzing the data using Granger- Causality and VAR, their hypothesis stood correct.

Konur (2013) wrote “The Relationship between Growth and Foreign Trade during the Debt Crisis: A Causality Analysis on the Eurozone Countries”. The global economic crisis of 2007-08 was considered as the most severe one ever since the great depression. The major problems during the global financial crisis (in EU nations) include liquidity challenge, front loaded austerity reforms, lack of fiscal support and policies, exhausted traditional monetary instruments, challenges of insolvency, toxic assets in ECB, etc. The author in the paper has examined the effect of debt on foreign trade and growth of the nation using Granger causality (on panel data). The findings suggest that there is a causal relation between most of the variables.

Alogoskoufis (2013) authored a paper “Macroeconomics and Politics in the Accumulation of Greece’s Debt: An Econometric Investigation” for the Hellenic Observatory (A European Institute). The time lag taken by the author for the econometric investigation is from 1975 (post democracy) till 2009 (crisis period). The author built a model with two political parties, which were in power one after the other. The model is based on two political parties (PASOK and NDP). They used primary expenditure and taxes to minimize debt accumulation. The model predicted a political equilibrium, where primary expenditure and taxes help to stabilize the debt- to- GDP ratio. However, this stabilization incentive is poor or weaker during election years. To test this econometrically, the author has taken data from 1975 till 2009. The outcome suggests that there is a weak stabilization during election years, which is characterized by a strong fiscal expansion. Overall, this model accounted for accumulating the debt of the Government of Greece in terms of increasing trend in primary expenditure, a positive shock to primary expenditure during election year. Due to tax smoothing, a weak stabilizing reaction of government revenue was also seen.

Swyler and Levendis (2013) wrote “What was the role of Monetary Policy in the Greek Financial Crisis?”. This paper was published in the South Eastern Europe Journal of Economics. In the paper, the authors have basically tried to see the impact of monetary policy of European Central Bank and the bank of Greece on the financial crisis of Greece. The authors used risk adjusted Taylor rule to examine the monetary policy of Greece, starting from 1993 till present. The authors argue that the European Central Bank does not satisfy the criteria for a sound monetary policy for Greece, and had a destabilizing effect on Greece’s economy. On the other hand, the Bank of Greece satisfied various criterions for a sound monetary policy for the economy. The authors conclude that the expansionary monetary policy of ECB led to further destabilization of the economy of Greece.

In July 2015, a special report was published by the German Council of Economic Experts on “The Consequences of the Greek Crisis for a more stable Euro Area”. The members of the council are of opinion that euro area has a fundamental problem in its single currency area as there is lack of fiscal and economic disciplines. The adjustment programs were quiet successful in other countries but in Greece. According to the members of the council, there is a need to strengthen the banking union, and the bank sovereign nexus is yet to be solved fully. The crisis could not be handled alone with fiscal policy. Monetary policy has to come in. The members concluded by saying that ‘reforms that stray from this guiding principle plant the seeds of further crises and may damage the process of European integration.’

Panagiotidis and Printzis (2015) from London School of Politics and Economics wrote “On the Macroeconomic determinants of the housing market in Greece: A VECM Approach”. The authors in the paper have tried to examine the role of housing market in the economy of Greece (during the crisis period). Using GC and VECM approach, the authors suggest that there exists an equilibrium relationship. In the long run, mortgage loans and retail sector became extremely important variables for housing sector. The results derived from the dynamic analysis of GC and VECM shows that the mortgage loans followed by retail trade are the variables with the most explanatory power for the variation of the houses price index.

Nikiforus, Carvalho and Schoder (2015) published a working paper “Twin Deficits in Greece: In Search of Causality”. In the paper, the authors have discussed the public deficit and sovereign debt trajectories of Greece between 1980 and 2010 (for a period of 30 years). A special attention has been paid to the causality between public debt and external deficit post- Maastricht treaty. The hypothesis is that because of monetary unification in Europe and with the adoption of common currency, causality ran from external deficit to public deficit. Co- integration analysis and Granger causality were used to test the hypothesis empirically. The results were in support of the hypothesis.

Stolbov (2015) wrote on “Causality between credit depth and economic growth: Evidence from 24 OECD countries”. The author have used lag augmented VAR Granger causality test in order to investigate causality between GDP and growth in a time series and country by country framework. Fully modified ordinary least square and BC causality is also used to check the results. “Causality running from credit depth to economic growth is found for the UK, Australia, Switzerland, and Greece. The findings lend no support to the view that financial development shifts from a supply-leading to demand-following pattern as economic development proceeds. The aggregate results mesh well with the current discussion on too much finance and disintermediation effects. However, idiosyncratic country determinants also appear significant.”

Puig and Rivero (2015) again wrote “On Bi- directional causal relationship between public debt and economic growth in EMU countries”. Continuing their previous research, the authors came up with new evidence on a possible bi- directional causality between debt and growth in EU member countries, who are also a member of Eurozone (EMU). Using bilateral GC to test for heterogeneity, the results suggest a “diabolic loop” between growth and debt between 1980 till 2013. Greece, Belgium, Netherlands and Italy suggested an overall negative effect over growth and debt.

From the above reviews, we can conclude that various authors feel that fiscal policy would have played a major role in curing the crisis if monetary policy would have moved together with it. That is, keeping fiscal policy decentralized and monetary policy centralized was the biggest mistake committed by EU. Fiscal policy and monetary policy needs to move hand in hand. Had the fiscal policy also been centralized or monetary policy decentralized, it would have been possible for EU to come out of the crisis without much difficulty. Corruption, fiscal deficit, socioeconomic and political instability, high level of unemployment followed by low inflation rate helped the crisis to grow. The institutional structure of EMU and the European political environment led to the Greek crisis. As a policy recommendation, the author suggests Greece to restructure its institutions and promote political- economic convergence. A strong political and democratic process should be developed, and legitimacy should be provided without forgoing its technocratic efficiency.

A few authors are of opinion that austerity measures taken by the Government of Greece can help Greece come out of the crisis. But econometric investigation suggests that gender inequality, poverty and unemployment have increased because of austerity reforms. Austerity would help in reducing in fiscal deficit, but at the same time, it would give rise to even greater recession. As the monetary policy is centrally controlled

by the European Union directly, and the member states can control their affairs through fiscal policies only, thus Greece was also left with only option of fiscal regulation. Austerity included, or the fiscal consolidation included cutting down the spending and increasing the tax rate for the public. This can further lead to stagflation, which is even worse than the condition of depression or recession. This depression became more severe because there was no growth in the economic system, and decision taking was delayed a lot, leading to even worse situations.

A few authors have also tried to test for causality using Granger Causality and VAR. National debt, intra and extra EU trade balance, government deficit and interest rates granger cause each other and are responsible for the Greece's poor intra-EU trade balance. Causality between foreign debt and public debt got reversed after the European monetary unification process. Authors have also studied for a bi-directional causal relationship between public debt and economic growth in both central and peripheral countries of the EEMU. Debt has a negative effect over growth from an endogenously determined breakpoint and above a debt threshold ranging from 56% to 103% depending on the country.

#### **IV. Data and Methodology**

##### **4.1 Data**

Data has been extracted from World Bank Database from the period 1993 till 2013. OECD database was used to fill in the gaps, i.e. where data from World Bank was not available. Seven variable viz. balance of payments, central government debt, net FDI inflows and outflows, GDP growth rate, inflation rate, savings rate and unemployment rate have been analyzed in the following sections using co- integration and granger-causality tests.]

##### **4.2 Methodology**

Granger causality test has been performed to validate the study. The first step is to check if the data is stationary or not. If the data or series is not stationary, it means that there is presence of unit root. By taking first order difference, we can restore the stationarity of the series. Stationarity check is an essential part in order to avoid incorrect conclusions.

After checking for stationarity, co- integration test is performed on non- stationary series. Co-integration analysis is used to estimate and test stationary linear relations, or co- integration relations, between non-stationary time series variables. The vector autoregressive (VAR) model framework has been widely applied to model co- integration system.

Co- integration test is done using Engel- Granger methodology. This is done on non- stationary series' level data. On level data, the series came out to be co- integrated. Analysis of Variance (ANOVA) was also used to check for structural breaks in the data, using dummy variables. Dummy variables classify data into mutually exclusive categories:

$$Y_i = \alpha + \beta_1 D_{1i} + \beta_2 D_{2i} + u_i$$

Here, were took dummy variables to classify data in the pre- crisis period ( $\beta_1 D_{1i}$ ) and post- crisis period ( $\beta_2 D_{2i}$ ). This was done in order to check structural break in the series. Graphically, structural break was seen. After graphical analysis, ANOVA test was done on every single variable. Only unemployment showed a structural break in 2008. No other variable showed structural break using ANOVA (single factor model). One possibility could be less number of observations in total and uneven distribution of observations in the pre and post crisis period.

Granger- Causality testis sensitive to lag length. So 42 pairs were formed, and for each pair, AIC was calculated for up to 4 lags. Lower the AIC, better the model. These were then sorted as per lowest AIC in different lags, and pairwise test for Granger Causality was done. The results of Granger- Causality test are shown in analysis.

#### **V. Dynamics in EU and the Greece Crisis (Analysis)**

In this part of the study, we are dealing with time series analysis. For this, most important aspect is to check if the series or data is stationary or not. This should be done in order to avoid incorrect conclusions. Two unit root tests have been performed for the study viz. augmented dickey fuller (ADF) test and Phillips- Perron (PP). These results have been generated using EViews 9 SV software.

##### **5.1 Unit Root Tests**

Augmented Dickey Fuller Test:

Null Hypothesis: Series is not stationary

Alternative Hypothesis: Series is stationary

With Trend Critical tau at 5%: -3.622

Without Trend Critical tau at 5%: -2.998

**Table II: ADF Test Results**

Variables	With Trend		Without Trend	
	At Level	1 <sup>st</sup> Difference	At Level	1 <sup>st</sup> Difference
BoP	-0.5995	-3.6781	-1.3329	-3.4996
Debt	-2.1920	-4.7870	-0.5181	-5.3984
FDI inflows	-5.3850	-5.3850	-5.5179	-5.5179
GDP growth rate	-1.7218	-3.8398	-1.6000	-3.9459
Inflation Rate	-3.0588	-5.4348	-3.4116	-3.4116
Savings Rate	-1.7447	-4.1568	-1.2117	-4.2556
Unemployment Rate	-3.5773	-3.9972	-3.4436	-4.1205

From the above ADF test results, we see that for most of the variables, data is not stationary with both with and without trend at level. However, they become stationary after it is differenced only once. Variables FDI inflows in trend and FDI inflows, inflation rate and unemployment rate in without trend were stationary at level, whereas others got stationarised only after first difference.

Phillips Perron Test:

Null Hypothesis: Series is not stationary

Alternative Hypothesis: Series is stationary

With Trend Critical tau at 5%: -3.622

Without Trend Critical tau at 5%: -2.998

**Table III: PP Test Results**

Variables	With Trend		Without Trend	
	At Level	1st Difference	At Level	1st Difference
BoP	-0.5995	-3.6235	-1.4860	-3.5117
Debt	-2.2536	-7.6545	-0.0302	-5.7824
FDI inflows	-5.3850	-14.1613	-5.5179	-14.3133
GDP growth rate	-1.8551	-3.8398	-1.7057	-3.9459
Inflation Rate	-3.2197	-5.3707	-3.4116	-5.0915
Savings Rate	-1.7447	-4.1325	-1.2117	-4.2392
Unemployment Rate	-0.6142	-3.8096	0.3572	-3.8979

From the above ADF test results, we see that for most of the variables, data is not stationary with both with and without trend at level. However, they become stationary after it is differenced only once. Variables FDI inflows in trend and FDI inflows and inflation rate in without trend was stationary at level, whereas others got stationarised only after first difference.

## 5.2 ANOVA

The critical F value is 4.4138 at 0.05 level of significance. When computed F value is greater than critical F, then we reject the null hypothesis.

**Table IV: Analysis of Variance Test Results**

Variable	F value	P value	Result
Balance of Payment	3.3697	0.0829	H0 rejected
Central Government Debt	1.1025	0.3076	H0 rejected
Foreign Direct Investment	0.1003	0.7550	H0 rejected
GDP Growth Rate	1.1946	0.2888	H0 rejected
Inflation Rate	4.0657	0.0589	H0 accepted
Savings (Gross)	49.106	1.5310	H0 rejected
Rate of Unemployment	9.9046	0.0055	H0 rejected

From the above table, we can see that only inflation rate and unemployment rate have a p- value, which is less than 0.05. So the null of all other variables (except inflation rate) will automatically get rejected as their p- value is more than 0.05.

The F value of unemployment rate is greater than the critical F, i.e.  $9.9046 > 4.4138$ , thus we reject the null. There is no statistical significant difference in the unemployment rate of pre and post crisis period. Therefore, there is no structural break. The F value of inflation rate is lesser than the critical F, i.e.  $4.0657 < 4.4138$ , thus we fail to reject the null. There is significant statistical difference in the inflation rate of pre and post crisis period. Therefore, there is a structural break. Statistically, there is no structural difference in variables except for rate. But graphically, a structural break was seen in all the variables during the 2008 crisis. There is a possibility that statistical significant difference was not seen because of uneven number of observations in pre and post- crisis period.



### 5.3 Co- integration

Co- integration test was performed among the non- stationary series at level data using Engel- Granger methodology. This test tells if the variables have equilibrium or long run relation between them or not. The series came out to be co- integrated on performing this test on I(1) series on level data.

### 5.4 Granger- Causality Test

The concept of Granger causality is based upon prediction. It is a statistical concept. According to Granger causality, if X granger causes Y, then the past values of X should contain information that helps predict Y above and beyond the information contained in the past values of Y alone.

**Table V: Granger Causality Test Results**

No.	Null Hypothesis	Obs	F- stats	P- value
1	BoP does not granger cause GDP growth rate	23	7.2908	0.0138
2	GDP growth rate does not granger cause BoP	23	9.9108	0.0051
3	Saving rate does not granger cause BoP	23	4.3392	0.0503
4	FDI does not granger cause Saving rate	23	5.4068	0.0307
5	Saving rate does not granger cause Unemployment rate	22	8.6842	0.0025
6	FDI does not granger cause Inflation rate	22	4.4136	0.0286
7	BoP does not granger cause Unemployment rate	21	3.5672	0.0418
8	Inflation rate does not granger cause Unemployment rate	21	3.6745	0.0385
9	Unemployment rate does not granger cause Inflation rate	21	4.3348	0.0233
10	GDP growth rate does not granger cause Inflation rate	20	9.5507	0.0014
11	Unemployment rate does not granger cause Debt	20	6.2153	0.0072
12	Saving rate does not granger cause Inflation rate	20	17.2812	0.0001

The above table shows only statistically significant results of GC test by taking p- value and f- value into account. Balance of payments is said to limit economic growth when the rate of growth is restricted by the availability of external resources. Both share a positive and a bilateral relation. It is not possible to correct balance of payment imbalances with the help of monetary policy alone.

When saving rate is high in a country, it means that people are spending less and saving more. It affects the balance of payments account of a nation. It also means that there is lesser FDI. People are not attracted enough to spend. Higher saving rate also accounts for higher unemployment rate in an economy. Lesser FDI means lesser inflation rate. Lower rate of inflation would again bring the economy into the state of depression. Only monetary policy can help the economy come out of depression. Inflation rate and unemployment rate are negatively related. It also validates the short run Phillip's curve. Also, in case of poor GDP growth rate, the economy would not progress, leading to lesser inflation rate. Similarly, unemployment is related to debt and saving rate is related to inflation rate. In most of the cases mentioned in the above table, one of the variables is controlled by monetary policy and the other by fiscal policy. In case of Greece, only fiscal policy is in control by the nation's authorities. Monetary policy on the other hand is controlled and governed by ECB and EMU. Thus this is the biggest flaw of European Union as a trade bloc.

## VI. Conclusion and Discussions

Greece joined the EEC in 1981, and became a member of Eurozone in 2001. The Maastricht treaty provided the criteria for the EU member states, who wished to enter the Eurozone. At the time of entering the Eurozone, Greece did not meet with all the targets. So Goldman Sachs was appointed to monitor Greece. But instead of monitoring Greece for its high debt to GDP ratio, Goldman Sachs thought of earning. It gave a secret loan of 2.8 Billion Euros, and entered into a swap.

When Greece entered into the swaps, by then it had already joined Eurozone. It entered into swaps in order to reduce its debt to GDP ratio (clause of Maastricht treaty). The swaps were used by many of the European Governments to meet the terms of the Maastricht treaty. The swaps were executed in accordance with Eurostat rules. But the debt to GDP ratio of Greece kept increasing. It was not able to repay its debts. Instead, it violated the clauses of Stability pact and Maastricht treaty. After a decade of overspending, Greece was not prepared for the financial crisis of 2008. From 2009 onwards, as a consequence of misuse of European loans by the corrupt Greek government and politicians, fear developed in the investment market concerning the ability of Greece to repay its debt. Various bailout loans were provided to Greece, and at the same time, Greece was advised to follow the austerity reforms (which was highly unpopular among the citizens of Greece).

The question that arises is where did all this bailout money go? In 2011, the total population of Greece was 10816286. Out of this, more than 65% population belongs to the age group of 15- 64. Almost 19% population belongs to age group of 65+. In such a country, the government should spend on public health, education, and on other public expenditures. But in reality, most of this money is spent on repaying the debt. The Greek Government used 140 billion Euros to repay the original debts and interests, 48.2 billion Euros to

capitalize the private Greek banks, 34 billion Euros on government bonds. Less than 10% of this entire bailout money was left after these payments, and this was used by the Government of Greece in order to reform the economy and to safeguard the weaker section of the society. Greece government should spend more on social infrastructure than on repaying its debt obligations.

This brings us to the two options that Greece is left with. Either it can adopt the austerity reforms, or it can follow the Keynesian ideology. Austerity measures refer to the fiscal tightening by the Government of a country in order to limit its spending. Various sets of austerity measures have been introduced in Greece since 2010. But the austerity reforms introduced in Greece included only raising taxes and cutting on spending, but there was no increase in public welfare as such. Because of this, austerity reforms were highly unpopular among the folks of Greece.

During the 1930's great depression, Keynes taught that "deliberate deficit spending during an economic downturn does not just alleviate hardship — it helps to turn the recession around. The debt accumulated can be paid off in better times (austerity) — indeed, when an economy is growing, debt can shrink as a proportion of GDP without even needing to run a surplus." Far from imposing austerity, this action by other Eurozone countries and the IMF actually prevented far worse austerity. But the people of Greece nevertheless underwent one of the most severe downturns in recent economic history, returning to growth only in 2014, and now plunged again into recession as the actions of Syriza government and the stalemate in the negotiations over its new demands continuously.

Greece was the only country in the Eurozone to have its debt to GDP ratio more than 100% much before the crisis hit. Then, it rose exponentially. This was not the case of Keynesian stimulus, or of borrowing to invest, or of bailing out banks. With a high debt deficit already in account, an annual deficit of 14% of GDP was a disaster. This is an example showing what could happen if public finances get out of control. But the magnitude of Greece's debt puts it into a different league from the debate elsewhere, such as Britain, and comparisons made by Osborne to the Greek situation are way off the mark.

Keynesian economics focuses on change in AD (aggregate demand) and their ability to create inflationary or recessionary gaps. Keynesian economists argue that "sticky prices and wages would make it difficult for the economy to adjust to its potential output." Keynesian economists urged the use of monetary and fiscal policies in order to AD curve and to close the gaps which arise because of recessionary and inflationary gaps that persist for longer periods.

But for Keynesian ideology to work in case of Greece, the monetary policy and fiscal policy should have worked together. But Greece is a part of European Union and Eurozone, where all member states have a centralized monetary policy and a decentralized fiscal policy. The analysis results using Granger Causality test suggests a strong bilateral relationship between Bop- savings, debt- inflation. As most of the events that occur are co- related, and there is not only one factor influencing it, similarly Greece crisis is also a combination of mishaps. It was high level of debt, which caused low rate of inflation, low GDP growth rate.

There was also a high BoP deficit, which led to high savings and low investments. This was followed by high unemployment rate, especially among the youth. Thus, future of Greece can be predicted using Granger causality test results. Since the government of Greece does not have a hold on its monetary policy, trying to curb the crisis using fiscal policy alone will lead to stagflation. The results from Granger causality test second this opinion.

There is a fundamental problem with the establishment of Eurozone. The biggest flaw of Eurozone is its centralized monetary policy and decentralized fiscal policy for its member states. Different economies will be at different levels. So if two economies are facing inflation, and other two are facing deflation, then what measures will EMU take in order to curb inflation rate in country facing inflation and to curb deflation in countries facing deflation? If it takes measures in favor of inflationary country, then the deflationary country would deflate even more. And just with the help of fiscal policy, deflation would converge into stagflation, coming out of which is again extremely difficult.

There are both benefits and costs associated with EU and Eurozone. On one hand, it reduces monetary risks by pooling risks; it increases the potential for stability within EU, brings in more transparency, reduces price discrimination, and promotes trade and job creation. But these benefits come with a cost. It is said that EMU brings a discipline against inflation. But this contradicts with what just happened during the 2007-08 global economic crises.

Because of a uniform monetary policy between the Eurozone member states, there is a loss of economic sovereignty. Euro has to deal with asymmetric shocks, and one cap does not fit all. The recent financial crisis of 2007-08 has re- opened the debate if the benefits of joining a currency area outweigh the costs associated with it. In the recent past when Greece was not being able to repay its debts, various questions were raised if Greece should leave the currency union. Greece did not meet the criteria mentioned in the treaty of Maastricht and did not follow the Growth and Stability Pact. If Greece is forced to exit the Eurozone or EU, the economy of Greece would collapse. The chances of Greece repaying on its debt would become near to zero.

This would give a bad impression to other EU and Eurozone members. They'll also take loan and not repay it later. Thus forcing Greece to exit the Eurozone is not a solution. Instead, Greece should follow the austerity measures sincerely. Various rounds of austerity reforms have been brought into force. But these all failed miserably. Austerity reforms are highly unpopular among the public of Greece. But austerity is not a choice in front of Greece, but a necessity. On the other hand, instead of spending all the bailout money on repaying the debt, Greece should have spent this money on welfare of its people, job creation, trying to bring prices up, etc. This could have helped the economy to boost, purchasing power among people would have risen, and this could have helped the economy to come out of the crisis.

Take the case of Ireland, which had no fiscal rescue available when the bubble burst there in late 2006. Instead of waiting for external help, Ireland underwent devaluation by cutting wages, which made the Irish economy competitive again. Ireland too got fiscal aid, but towards the end of 2010. Ireland then stopped its internal devaluation almost immediately. By 2015, its GDP surpassed the pre-crisis level. The point to be noted here is that Greece should also learn a lesson from Ireland. Both are members of Eurozone and EU. Both underwent financial crisis. But only one managed to surpass the crisis by tightening its belt, whereas the other still has to undergo various reform measures and will need external help in order to overcome the crisis. The financial crisis of 2007-08 shook the weaker economies of European Union. Does this call for a disintegration of European Union as a whole? In my opinion, neither forcing Greece to exit the Eurozone and EU, nor the disintegration of EU is a solution to overcome this crisis. Instead, ECB and EMU should keep a check on the member states, if they are meeting with the pact and treaty or not. It should also keep an eye on the activities of monitoring agency (Goldman Sachs in case of Greece). Reform should be brought about for fiscal policies and monetary policies. Either fiscal policies should also be centralized and entire Eurozone should be treated as a single country, or monetary policy should be decentralized and each member state should be independent.

But decentralizing monetary policy means disintegrating the European Union, which again is not a good idea. In my opinion, the other option sounds good. If not, then EMU should keep an eye on the member states. Actions should be taken against those, who do not meet with the criteria of treaty and Stability pact.

Another alternative with EU is that it should give a certain amount of autonomy to its member nations who are in crisis to control a part of the monetary policy, in order to bring back the economy back to normal, with certain conditions. By this way, EU would not disintegrate, and the economies would get certain autonomy to control both fiscal and monetary policies by itself. At the same time, EU should keep a close eye on such nations.

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