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Editorial Offices: Corso Umberto I, n. 83 - 65122 Pescara
Tel. +39 0854219109 – Fax +39 0854219380
Website: www.gler.it
E-mail: gler@fondazionepescarabruzzo.it

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SOMMARIO

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Nicola Mattoscio[*] - Iacopo Odoardi[**]

MONETARY STABILITY, EMPLOYMENT DILEMMA AND DEBT-CRISIS-CAUSED GREAT RECESSION: IS IT POSSIBLE TO SUPPORT AGGREGATE DEMAND?

Abstract

In this paper we exploit two relevant economic relationships, the Phillips Curve and the Okun's Law, to analyze the socioeconomic effects arising from the diffusion of the Net Economy in important economic aggregates, the G7 group of advanced economies and the Euro Area, representing the Countries in which these events were more significant. As an international comparison of different size scale it is also proposed a specific analysis for the Italian case. Economic aggregates were chosen because, remaining homogeneous within them, should express a clearer and linear trend for the two relationships, between variables related to inflation, unemployment and the change in GDP. In these contexts should be attenuated exogenous influences, that would otherwise alter the behavior of some variables.

The idea is to jointly exploit the significance of these two reports, both built from the observation of empirical relationships persisted in the 50s, that will be searched in the latest data of the same economic variables. Given sufficiently long time series, representative of phenomena occurring in recent decades, we also expect to have particular values in the analysis because of the international economic and financial crisis, especially with reference to the period 2008-09.

Our analysis of dependence between variables have as discriminant the year 1995, in which traces the birth of the Net Economy, for the G7 and Italy. For the Euro Area we consider 2002, the year in which there was the introduction in monetary circulation of the single European currency.

[*] Department of Quantitative Methods and Economic Theory, University of Chieti-Pescara, Viale Pindaro 42, Pescara 65127, Italy, Tel.: +390854537583; E-mail address: mattoscio@unich.it.
[*] Department of Quantitative Methods and Economic Theory, University of Chieti-Pescara, Viale Pindaro 42, Pescara 65127, Italy, Tel.: +390854537679; E-mail address: iacopo.odoardi@alice.it.

In the first part of the paper are exposed the development of the two mentioned reports, from the original formulations to the most recent works relevant to our analysis. It is paid particular attention to those works that, as in this paper, exploit jointly the two relationships, that provide greater explanatory power of socioeconomic phenomena. Empirical analysis of the relationships of dependence from the Phillips and Okun relations are subsequently exposed.

One conclusion of our analysis is that in the current debt-crisis-caused Great Recession, there are convincing reasons for the Political economy to support employment without increasing prices and to meet Fiscal Compact restrictions.

JEL Classification: E20; E24; E31; E52.

Keywords: Monetary Stability; Unemployment; Aggregate Demand; Net Economy; Economic Recession.

1. Introduction

In economic studies there are important and tested relationships of dependence and correlation between variables that can be considered an instrument for better understand the phenomena in their occurrence and evolution and can also be used as support for economic policy choices.

The variables that affect the dynamics of an economic system are internal and external to the system and often connected to each other in many ways. Although relations between them, especially dependency, may provide valuable information for estimation and analysis of important socioeconomic events. There are also considerable differences in how the various national or regional contexts can address and respond to problems imported from outside and from the international relations. We must consider that there are groups of Countries that share political and economic aims, as in the European case, in which there is the presence of unified policies implemented in contexts characterized by different responses of internal variables from exogenous dynamics.

In most advanced Countries the same dynamics of the globalized economy naturally leads to greater and more relevant connections

with international events. The economic independence of national systems is reduced in the search of a positive and continuous evolution of the supranational system, that over the last three decades seems to have involved not only the economic context, but also the social and political ones, of an increasing number of Countries. The gradual convergence of many socioeconomic aspects and the continuous exchange relationships may also have the disadvantage of facilitating the spread of issues that arise in a system, and in case of lack of strong rules or special "barriers", then propagate in all the others systems that have close relations with it.

Such strict connections were made possible by the combined evolution of technological progress and the integration of the so-called *knowledge workers*, characterized by high productivity and specific skills and abilities. Mutual support among the new technologies of communication and information and a high level of human capital prove to be effective and essential in an evolving international context, also for these reasons highly competitive.

The characteristics of the New Economy, started in the mid 90s, have made possible rapid progress both economically and socially, making realistic the integration of national systems. The positive effects of new technologies and the major focus on the processes of education and training has brought benefits to many nations, most notably in the United States, where the Net Economy was born. There are significant differences between and within Countries, among those who have and those who have not been able to exploit these trends, such as the lack of certain essential elements. Among these we must remember the supporting processes of human capital formation, starting from education to continuing formation (life-long learning), and support to the public and private R&D activities.

Following the events of 1995[1], date of birth of the Net Economy, is relevant to consider the changes in the relationships between socioeconomic variables that had been formulated and tested on empirical values of the previous decades. These events have certainly had a greater effect on economies that were most able to exploit the

[1] Year that has seen a sharp increase in labour productivity, due to the widespread and appropriate use of ICT in many operational areas, especially in the most advanced economies.

improvements such as the widespread and efficient use of ICTs. For this reason we have considered in our analysis the two economic aggregates *G7* and *Euro area*, representing the most advanced economies.

Among these relations of fundamental importance there are the Phillips Curve, originally conceived by Alban William Phillips in 1958 and the so-called Okun's Law, proposed in 1962 by the economist Arthur Melvin Okun. The Phillips Curve is an instrument to observe the inverse relationship between the levels of unemployment and inflation in an economic system, while the Okun's Law is a correlation for estimating the output gap from the potential GDP, from the gap of actual unemployment from the natural level.

These economic laws, derived from empirical evidence, are identified through some regularities in the conduct of specific economic variables, and are used in this research in developing an understanding the events of the arising of the Net Economy and the recent economic crisis, generated in the U.S. in 2008. The negative impact of the crisis on national economies has been particularly dominant in 2009, and then we expect to find anomalous values in our analysis, outlier cases respect the usual ones present in the time series of the variables considered. In the next section are exposed in particular the evolution of the original Okun's Law (Okun, 1962) and Phillips Curve (Phillips, 1958), considering the latest and useful scientific contributions.

An intent of this paper is to analyze data on the levels of unemployment, inflation and changes in GDP in the light of the assumptions of Phillips and Okun to observe possible changes in the trends of the variables caused by the effects of the Net Economy. This research ranks among those who want to use multiple tools in a combined way to simultaneously consider the close relationships that the above phenomena have and that vary over time and across different socioeconomic contexts.

2. Okun's Law and Phillips Curve, recent applications and the opportunity to combine their explanatory effects

In this chapter are exposed the original themes and the latest relevant developments of the studies that are based on the writings of the 50s and

60s of Okun and Phillips, prior to proceed with the analysis of the data on the economic aggregates in the light of the relations of the two cited economists. It also incorporates a section that considers the simultaneous implementation of the two relationships, assumed together with the aim of a clearer understanding of economic developments.

2.1. The Phillips Curve, historical development and main areas of research

The Phillips Curve is an empirical relationship between the level of unemployment and the level of inflation in an economic system, proposed by the economist Alban William Phillips from New Zealand, in 1958. The studies of this Author began with the observation of an empirical regularity based on values of the British economy of the time, and were aimed to provide a solid explanation of the relationship between the level of unemployment and the rate of inflation, particularly wage inflation, with obvious implications for economic policy. Specifically, the English data, along with those contemporary of German, showed a trend inversely correlated of the two mentioned economic variables, with time deemed valid also for the price inflation as well as for the wages, and enlarging the conclusions to other Western Countries. Until this relationship was considered valid, it was possible to suggest to policy makers secure means of economic policy, for example, to keep the levels of inflation under control. It was a real trade-off between the two phenomena, then a society could choose whether to limit the growth in prices while accepting a high rate of unemployment, or the reverse. The innovation introduced by Phillips was to make possible a government control on typical targets of economic policy, because the relationship between the variables should remain stable over time. In fact, through instruments of Keynesian intervention, was considered possible to choose a "point on the Phillips Curve" on which to stand, thereby setting and checking the values of the two economic variables. For example, it was possible to control the levels of wages and prices starting from the support to aggregate demand (and then the employment of workers).

Rees (1970) highlights the opportunity for policy makers to choose the "price" to tolerate in terms of price variation just to be able to

choose the level of unemployment, also equal to zero. Given this trade-off, according to Rees, U.S.A. and Canada have chosen higher levels of unemployment and lower rates of inflation, while Western European Countries settled for a low level of unemployment and then accepting an higher inflation.

Such interventions of the short term rapidly found a limit to their action, when in the 70s occurred the phenomenon of *stagflation* in many Western Countries. That is the coexistence of high levels of both inflation and unemployment due, as well known, to the presence of shocks exogenous to the national systems, and in particular a sudden and strong increase in the cost of oil raw materials.

A further consequence of the joint occurrence of stagnation in economic terms and high inflation (from which the term stagflation) was to reduce the importance of public monetary and fiscal policy of Keynesian origin, that provided, in Countries with a market economy, a direct State involvement in the market.

According to Keynesian and post-Keynesian studies, the public intervention in supporting aggregate demand to an adequate level was essential to control the level of unemployment, while inflation could only be explained from any excess of aggregate demand (over supply), under conditions of full employment already reached (see, among others, Mattoscio, 1999). In this case it was not possible for the system to satisfy all the demand, generating the inevitable increase in price. Inflation was tolerated because, as mentioned above, allowed the economy to develop positively, and deflation would mean a drop in demand, typical of stagnation periods.

If all this was considered valid, it was impossible, according to the cited studies, to have high unemployment in conjunction with inflation, indeed generated only under conditions of saturated market, trying to produce the maximum possible amount of goods, occupying a high number of workers.

Among the first theoretical explanation to the limited effectiveness of public intervention there is the rigidity in the wage field, and the parallel resistance from the price side. Also the rigidity of the automatic adjustment of wages to prices (eg. of raw materials) was a strong limit to economic recovery. The mentioned changes in economic policy were

mainly influenced by the ideas of the monetarist non-interventionist school, in particular by Milton Friedman.

As a result of criticisms of the original Phillips Curve, the presumed empirical regularity has been the subject of numerous studies and investigations in the economic field. Among the many aspects that have been specified on the curve there is the distinction between the effects of short and long term.

In that context are the theories of so-called *NAIRU* (non-accelerating inflation rate of unemployment) that consider rational expectations (Sargent, 1971; Lucas, 1972) that change over time according to the information held by individuals, useful to make decisions. In this context the main idea was to demonstrate the long-run version of the original curve as a vertical line. In fact, the Phillips Curve regarded all possible combinations between unemployment and inflation that could be reached by means of fiscal and monetary policy, by shifting the aggregate demand function compared to that of supply in the short run. But in the long run, inflation is influenced by the supply of money, while the level of employment tends, with time, to steadily fixate, according to what is the "natural rate" of unemployment. In this condition the trade-off inflation/unemployment disappears. Among the scientific contributions that have disputed the possibility that the Phillips Curve could remain viable in the long run are those of Phelps (1968, 1970, in particular on the labour market frictions) and Friedman (1968, on errors in expectations) based on the neutrality of money and on the inflationary effects, then by denying, at least for the long term, the original assumptions of Phillips.

The importance of rational expectations is that they determine how economic agents perceive and expect inflation to come, and these expectations tend to occur as expected. The economic system must aim at a level of unemployment equal to the natural one (*NAIRU*), as if for example the level of unemployment to be obtained was lower than that of "balance" there would be an increase in the level of inflation also affected from the expectations (as suggested by Friedman without a better employment condition), and of course a decrease in the opposite case. The stability is reached if the level of unemployment remains at the natural level. The natural unemployment could not be

permanently reduced as suggested in the Phillips Curve, as it involves permanent changes in other economic variables, particularly wages, but in a context where price inflation was also growing, this did not improve the level of real wages, and thus did not allow decrease of the unemployment level (Friedman, 1968). Studies based on the above mentioned theory in summary consider how is impossible the full employment in an economic system. It is also necessary to underline how this rate exposed as *NAIRU* should not be considered fixed in time.

The response of Keynesian economists to criticism, after the studies on bounded rationality, concerned microeconomic justifications, such as the presence of sticky prices, at least in some markets (Fischer, 1977; Taylor, 1979). Under these conditions of rigidity of prices not all markets can adapt quickly and this makes plausible an aggregate output below the potential level. Still in the short term and with some rigid prices the increase in the money supply can increase the real output.

The innovations introduced in the 70s developed the so-called New-Keynesian Phillips Curve (*NKPC*), consistent with rational expectations, with the ideal displacement upward of the original curve. This shift created conditions of uncertainty and did not allow more to use the curve as a "tool" of economic policy.

It is also necessary to consider the contribution of Samuelson and Solow (1960), concerning the study of the increase in the level of inflation during the 50s, who did not have a clear origin and explanation. Their writings, starting from the observation of contemporary data and the experience of economic facts, were essentially acts to the understanding of how to achieve a level of stability from the price side and, at the same time, full employment. In the 60s it would seek a stabilization policy that would eliminate the unemployment that results from insufficient aggregate demand, without creating an excessive rise in inflation induced by the same demand. The Authors were referring to the Phillips Curve, expanding the potential of policy (Samuelson, 1961), but with the fundamental consideration that this could move with time, the function was unstable. Of course this was the post-World War period and the attempts to apply the Keynesian policy took place in a context of major changes. The inflationary growth

was presumably due to excess demand and in accordance with the themes suggested by Keynes (1940) is the occupation to be influenced by aggregate demand, and the excessive demand, or higher than the so-called full employment, inevitably leads to inflation. Of course alternative reasons were brought in explaining the excessive inflation of the mid-50s, for example due to the bargaining power of workers who were able to raise wages surely more than the increase in productivity. These theories have weaknesses in their applicability, and among the variants we remember that of Galbraith (1957) assuming some sort of agreement between workers and producers in order to raise both wages and prices, which may explain inflation.

In the U.S. inflation became a substantial problem in the next two decades, the so-called "Great Inflation". Among the causes there was a change of vision of the consequences of inflation, in particular the idea of possible employment benefits (Samuelson and Solow, 1960). In particular this assumption was assumed to afford expansionary fiscal and monetary policies, with a parallel low increase in inflation and lower unemployment. But the target of the 60s to achieve the desired level of unemployment, about 4%, led to a sharp rise in inflation throughout all the decade. It is necessary to say that the conclusions of the two Authors were based on a version of the Phillips Curve not built through the real values of variables, but rather followed a pattern assumed valid for the past decades.

In 1960 Richard G. Lipsey proved more rigorously the Phillips relation, or rather the trade-off between wage inflation and unemployment. The Author starts from the data of a single labour market to analyze the effects of excess demand, represented by the difference between the jobs available and the number of unemployed, which resulted in an increase in the wage rate, and of course a decrease if the offer was high. In addition to this direct relationship, there was the inverse relationship between excess labor demand and unemployment. In fact, the growing excess demand decreases the level of unemployment, although of course not mean that this level is canceled, it is always at least the frictional unemployment, caused by the fact that job seekers need time to find a job, when available.

2.1.1. Theoretical and empirical developments of the original Phillips Curve

As for Okun's intuition, even for Phillips over the years have followed scientific contributions that have verified (Mattoscio, 1998), added new variables, updated the estimates or revised the statistical methods used. Among the main concerns to be clarified (Desai, 1975), it became clear to scholars the need to confirm the strength and durability over time of the relationship between inflation and unemployment, and then the form of the curve, downward sloping or a vertical line as predicted by neoclassical economic theory (Friedman, 1968; Phelps, 1970).

In the paper of Modigliani and Tarantelli (1973) empirical values are analyzed in relation to the original dynamics of Phillips with regard to developing Countries, making an historical comparison with the Italian post-war period, distancing from previous studies, which considered only the advanced economies. It is demonstrated that in conditions where there is a part of the workforce, in particular the trained labour force, in increasing numbers, there is no a single relationship between wages and unemployment, for the Authors: "*This is because the pressure exercised on wages by a given level of unemployment depends on the composition of that unemployment as between the trained and untrained labour force which itself shifts in the process of development*" (Modigliani and Tarantelli, 1973).

There are numerous studies that have attempted to apply the findings of Phillips to specific cases of national economies, also trying to improve the original assumptions. Among the numerous works we mention Khan and Zhu (2006) for the U.S. case with a focus on "sticky-information" about the timing and effectiveness of information dissemination. The paper of Rowley and Wilton (1974) on empirical values of Canada is based instead on the distinction between the behavior of distinct groups of the labour force with different contracts. An analysis extended to the *OECD* Countries was conducted by Grubb (1986), observing that, during the post-war period, the average ratio between the variables of the Phillips Curve was of one percentage point increase in unemployment related with a fall of two percentage

[10] Or, were they the *Ten Commandments?*

point in wage inflation during the first one or two years, and about one point for subsequent years. Furthermore, in earlier studies it was re-estimated the shape of the curve and observed as the shape varied in time (among others Desai, 1975).

Criticisms on the Phillips Curve also come from the estimation method of the same relationship, as in Gilbert (1976) using the most modern statistical procedures, or more specifically as in Kuska (1966) on the method of estimation of the so-called cyclical loops that he found when the data were connected period by period, around the fitted curve. Modern methods of analysis have also been used by Mavroeidis (2005) with a forward-looking rational expectations model, considering rational expectations, such as in the New Keynesian Phillips Curve of Galì and Gertler (1999). The work of Roberts (1995) brings the formulation of the *NKPC* models to the original expectations-augmented Phillips Curve of Phillip and Phelps. Alogoskoufis and Smith (1991) use the expectations-augment Phillips Curves (on U.K. and U.S.A data) to confirm "*that the persistence of price inflation is significantly higher under managed-exchange-rate regimes than under gold-based, fixed-exchange-rate regimes*". Cogley and Sbordone (2008) started from the assumptions of the New Keynesian Phillips Curve to develop a new version that allow to overcome the limit of the little inflation persistence, that is a version of the *NKPC* that incorporates a time-varying inflation trend.

As for the original relationship between economic variables of Okun, there are scientific contributions based on analysis of the different "response" of what can be considered the dependent variable, that is an asymmetric reaction to monetary policy as in the model of Schaling (2004): "*positive deviations of aggregate demand from potential are more inflationary than negative deviations are disinflationary*". In the paper of Temple (2002) is criticized the relationship, known in literature, that links the openness of an economic system and the slope of the curve, then the trade-off of Phillips (Romer, 1993), a connection, for the estimates of the Author, not so strong in correlation terms. Brinner's work (1977) criticize the very existence of the Phillips trade-off, that would be only of transitional type, due to the combination of persistent high inflation and unemployment.

Many of the Western Countries that form the aggregates used in this work are also considered in the paper of Paldam (1980), who has developed an international comparison on the relationship of Phillips to observe the outside influences on the report, especially the wage formation. In addition to the classical explanations on the increase in salaries of internal type (limited role of prices of imports, minor effects on total demand generated by exports, Countries do not always follow closely the *EFO*[2] guidelines to control the levels of wages) whereas it would be indeed strong the effects of international interconnection on the unexplained portion of the increase of wages.

2.2. The original Okun's Law

The Okun's Law is an empirical relation based on the identification and estimates of changes in GDP of a Country considering the levels and the variations of the unemployment rate, both natural and total. Okun's intuition, starting from the observation of the conduct of economic variables, was to consider how the higher level of actual unemployment than the natural one in the United States, caused an increasing gap in the level of GDP (or production), respect of what is its optimal potential level. In particular, it was verified that the increase in the unemployment rate by 1% affected for a value between 2 and 3 percentage points in the negative sense the real GDP. This relationship, despite many versions have been developed considering other aspects not incorporated by Okun, in its simplest form it is represented as follows:

$$\textit{change in unemployment rate} = a + b(\textit{real output growth}),$$

and can be called the *difference version* of Okun's law, where b is said the *Okun's coefficient* and $-a/b$ gives the rate of output growth present with a stable unemployment rate (Knotek, 2007). The second version of the relationship provided by the same Okun was rather useful to observe the unemployment connected with the difference (gap) between the current output and the potential one reachable by the economic system, and this is equivalent to:

[2] The model of Edgren, Faxen and Odhner (E.F.O.) created in Sweden to ensure the competitiveness of the system by controlling the rate of growth of wages.

unemployment rate = c + d(gap between potential and actual output), where *c* is the level of unemployment reached when the system is fully exploited and the coefficient *d* must be positive to be valid the above relationship as theorized (Knotek, 2007).

The theoretical basis of the observation of Arthur Okun is the assumption that when there is a period of economic expansion the economic system tends to produce more and to do that, more workers are employed, or those already present work for longer periods of time.

The empirical regularity provided by the American economist in its original version already considered some distinctive features of the U.S. labour market: the degree of participation in the labour market, the number of hours worked per employee and precisely the productivity of labour. These could affect the regularity assumed for other Countries, as seen in the data from the United States.

The original importance of that rule, as said derived from empirical regularities, is based on the fact that if these assumptions are valid, macroeconomic policies may obtain explanations regarding the growth of aggregate output. Of course the relationship can be useful and understandable from the opposite point of view, so a negative change in GDP would lead to a decrease in the required workforce. In particular, since the early findings of the same Okun, the ratio of change in GDP and unemployment was equal to an estimated value of 2,5, so an increase of one percentage point of unemployment tended to reduce the U.S. GDP by 2,5%, compared to the long-term trend. If observed in the opposite direction, as mentioned, the relationship shows how to contrast unemployment, namely the national income must increase to a greater degree respect that of productivity growth and population (which represents the long-term trend of income growth).

2.2.1. Recent developments and space and time applications

An important aspect to be considered on Okun's Law, subject of scientific papers, is the asymmetry of the regularity (among the many contributions Silvapulle et al., 2004), that the influence of positive variations on the economy on unemployment is different from that of the negative changes, being cyclical unemployment more sensitive to

the latter economic variations, at least in the United States. In other Countries the presence of more restriction, such as in the field of dismissal, do not directly reduce the working population when there are adverse economic conditions.

There are also criticisms on the original formulations of Okun in the calculation and estimation of the optimum levels of growth and unemployment levels, that should be connected together and explained through the known variables: the growth rate of GDP and the changes in the rate of unemployment. In Thirlwall (1969) the estimate is made just referring the original assumptions of Okun, in which the change in unemployment was estimated by the regression $\Delta U = a\text{-}b(G)$ "*to estimate the rate of growth above the natural rate necessary to reduce unemployment to the target rate of 4,0 per cent and to calculate indirectly the natural rate of growth, but it is not clear from his work whether he recognizes that the natural rate of growth (or the growth rate of productive potential) can be derived directly from the same regression without further additional calculations*." with *G* "*the percentage rate of growth of real output*" and the variation of *U* "*the percentage rate of unemployment*".

These and other variables have been tested in numerous articles over the years, even restating the original coefficient determined in the 60s (among the many contributions Smith, 1975; Gordon, 1984; Knoester, 1986; Kaufman, 1988; Prachowny, 1993 and Weber, 1995) and in many Countries to obtain confirmation of the supposed regularity, although with obvious differences in the coefficients that govern the relationship between the two variables.

The international comparison has shown that the regularity of Okun remains essentially valid for the United States (and Canada) than Europe and Japan (Moosa, 1997, in an analysis on the *G7* Countries) and that differences between Countries exist because of the different level of rigidity in the labour market. The Author assumes that this happens because in Canada and United States there is a greater responsiveness of employment levels compared to economic growth, due to the lack of guarantees in the workplace, that allow to vary the workforce according to the economic trend.

2.3. The explanatory capacities of the original relations of Okun and Phillips

The relations known as Okun's Law and Phillips Curve are tools that can be used simultaneously to thoroughly investigate the economic phenomena, as in this paper is made for the Net Economy also considering the international economic crisis. Since the 70s, tests were made to insert other economic variables in explaining the output formation, and to make clear the limits of intervention of policy makers. Among the questions to be clarified are the different influence of inflation and unemployment on the output, or the effect of these phenomena on dissimilar social classes (Rees, 1970).

Glejser and Ghikour-Mpia-Mwel (1970) have used these two relations along with the work of Eckstein and Fromm (1968) with a model that considers the change in price levels, by introducing the cost of labour and of material inputs. In the paper of 1970 the known relations are so exposed: the first equation (*Phillips*) indicates the level of wage (w), as a function of unemployment (U) and two positive parameters (χ,θ): $w = \chi - \theta U$; the second one (*Okun*) is a productivity function of the type: $py = \gamma + \delta e$, with e the rate of change of unemployment and two parameters (γ,δ) of which the last positive; the third that, as mentioned, considers the prices of inputs: $p = \alpha(w\text{-}py) + (1\text{-}\alpha)m$, then the changes are considered in terms of cost-plus, including the rates of changes of prices (p), wage rates (w), productivity of labour (py) and import prices (m), plus a parameter ($0 \leq \alpha \leq 1$); as last condition, the authors assume the rate of change in employment (u) proportional to that in unemployment $e = -\pi u$. The application of the theoretical construct on data from 14 Countries over 19 years has verified that the price level is negatively affected by unemployment, in addition the effect of import prices on domestic ones is substantial, finally they found a negative correlation between short-run increasing returns to labour and unemployment.

In the paper of Apel and Jansson (1999) are used the basic relationships between economic variables of Phillips and Okun for the estimation of the potential output and the natural rate of unemployment of an economic system, the rate that does not cause increases in inflation (*NAIRU*). The Authors use data from U.S.A., U.K.

and Canada, Countries where the relationship should be stronger, as originally tested in the estimation models. This research work is based on finding the related gaps in the output and in employment, whereas these distances also mark those of the general economic performance than the potential level, influencing inflation. The original idea in this case is to simultaneously (with the unemployment level) consider that the latter contains useful information on the extent of the economic gap. In the paper of Lines and Westerhoff (2010) it is analyzed the interplay between heterogeneous expectation formation and macroeconomic dynamics. The Authors use a model composed of Okun's Law and an expectations-augmented Phillips Curve to describe the supply side of an economic system and an aggregate demand relation, with the aim to understand the effects of heterogeneous expectation on the dynamics of the model. Another work that considers simultaneously the two relations is that of Mayes and Viren (2002), with specific reference to the *Euro Area*. The Authors consider a key point of the European socioeconomic development that is "*the implications for a single monetary policy when key economic relationships are nonlinear or asymmetric at a disaggregate level*". These differences between Countries (and regions within them) are directly observable by the relationships between variables that are used to construct the functions of Phillips and Okun. The Authors consider that a high level of unemployment has low impact in pushing down inflation, whereas if the unemployment level is low, the effects in increasing inflation are stronger. Furthermore, economic recessions tend to push up unemployment quickly, rather than to lower it during positive periods. The "common" economic policies can not have the same effects in Countries with large disparities also in terms of responses, speed and extent to these measures. It is predominant in Europe the rigidity in labour market, unlike the U.S., which would tend to perpetuate high levels of unemployment and negative periods. One reason is the asymmetry of the labour market and in particular the low mobility of workers, as well as differences between economic sectors and regions. The paper of Aguiar and Martins (2005) applies in particular the trade-off of Phillips, but also the concepts of Okun's Law, for the test of the significance and the non-linearity (asymmetry) of the trade-off between the unemployment gap and the variation in

the level of inflation in the *Euro Area*. The authors also suggest that the monetary policy of the *ECB* should be looking more closely at data showing the asymmetry of the Phillips relationship, which was already discussed in the appropriate section.

3. Analysis of the economic variables that compose the relations of Okun and Phillips in the light of the changes of the New Economy

The rise of the New Economy in the mid 90s is considered as a cause of the change of the *NAIRU* curve by Ball and Mankiw (2002), not only by changes in the labour force, but leading to broader changes in the economy. The Authors explain the fall in the second half of the 90s not using reasons related to government policies or demographics, but regarding the fluctuation in productivity. In fact, during the 70s the *NAIRU* curve lifted up while the rate of productivity slowed, and with the events of about 20 years later, that did increase productivity quickly, the same curve shifted down. This can change the purposes of prediction[3] of the curve as an instrument for economic policies. Among the motivations of the deviations there are, as already mentioned, the variations in unemployment in specific groups of worker, thus a quantitative reduction of a group with a low or high level of unemployment can modify the aggregate rate. Ball and Mankiw (2002) suggest the causes of change inherent into the New Economy: the increasing international trade relations (globalization), the lower (temporary) unemployment caused by the changes in job activities due to the characteristics of the economy in the 90s, but above all the rapid increase in the worker productivity, thanks to the widespread diffusion and use of the new information and communication technologies.

3.1. Empirical analysis of the relations of Phillips and of Okun

The data used to estimate the relationships of Okun and Phillips are from the International Monetary Fund, specifically the variables are: the *average consumer price (inflation)*, the *unemployment rate* and the *gross*

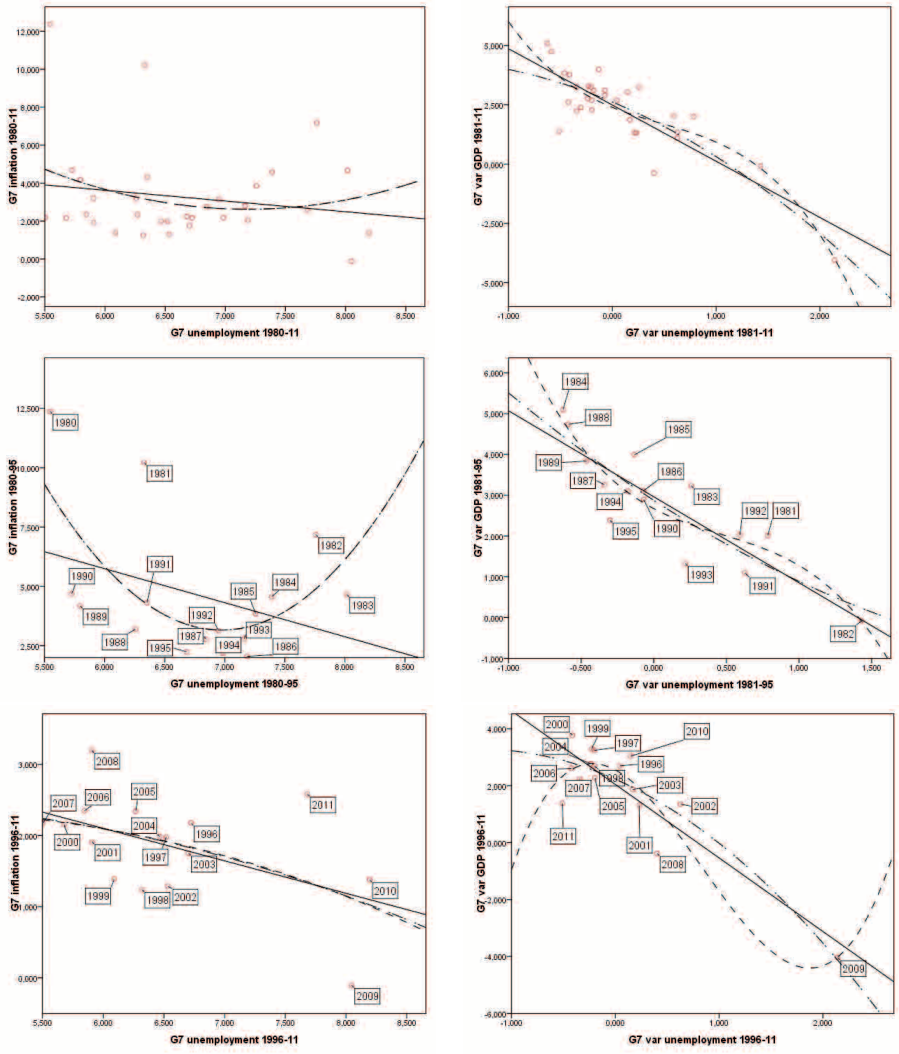
[3] It is expected an increase of the rate of inflation if the unemployment level is below the natural rate, and the opposite.

domestic product (constant prices) percent change. For the variation of the unemployment rate we used the classical formulation U_t-U_{t-1}. Subject of the analysis were primarily representative groups of Countries, considering adequately long time series. The first aggregate of nations is what the IMF defines as the group of most advanced economies, the so-called *G7*[4]. The second aggregate is partially connected to the first one, the *Euro Area*[5], it is composed of the 17 Countries that adopt the single European currency. Finally, as international comparison, we propose the statistical analysis applied to a single Country, Italy. For *G7* and Italy we considered a time series of about 30 years (1980-2011), also dividing the analyzes for two periods of significant historical interest and adequately representative. The dividing line is the 1995, when the Net Economy has started showing its effects, particularly in the most advanced economies. For the aggregate *Euro Area*, the discriminant year is the 2002, because January 1 of that year started the monetary circulation of the Euro as unique currency, while from 1999 was present in financial markets. For this group are considered two time periods of 10 years before and after the year of introduction of circulation of the Euro. The economic variables selected were placed in relation respect to the original relationships of Okun and Phillips, for the two groups of Countries and for Italy. The first analysis considers the assumptions of A. W. Phillips (1958) putting the variable indicating inflation as dependent and the unemployment rate as independent variable. The second analysis considers the annual change in GDP the dependent variable and the variation for the same period of the unemployment rate as independent variable. In the following graphs are reported these economic variables, to which have been applied, in each case, the estimation models of dependence. In particular the models of dependence used, required to clarify these relationships, are the linear (continuous line), quadratic (dash-dot line) and cubic ones (dotted line). The importance of these relations in the economic field and the numerous studies dedicated lead us to think that the three estimation models should have similar and close trends. The graphs cover the entire time series considered and below there is the divisions into two

[4] G7 Countries: Canada, France, Germany, Italy, Japan, United Kingdom, United States.
[5] Euro Area (17): Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, Spain.

successive time periods, with the aim of observing the evolution of the expected empirical regularities. Changes may be due to modification of other important socioeconomic variables or outliers cases due to external events with a relevant international impact. Furthermore, we must consider in advance that such relationships, often created and tested on data from the U.S. or economic aggregates, although generally valid also for the smaller economies, may be for the latter much less linear and clear. The estimation models are therefore more suitable for explaining the relationships present in the first two groups, *G7* and *Euro Area*, than in Italy, in which external influences and the presence of extreme values also because of internal measures, can lead to a tendency not very defined. Regarding the analysis of an individual economy we should in fact consider the strong influences from international relations (Paldam, 1980), and the national characteristics, such as that in Italy (and Europe) did not allow a rapid change in employment levels, in contrast to Countries like U.S.A. and U.K. (see Sumner and Ward, 1983, for the U.K.).

Figure 1. The dependence of the empirical relationships of Phillips and Okun for the *G7* economies, 1980-2011



Source: Our elaborations on IMF data

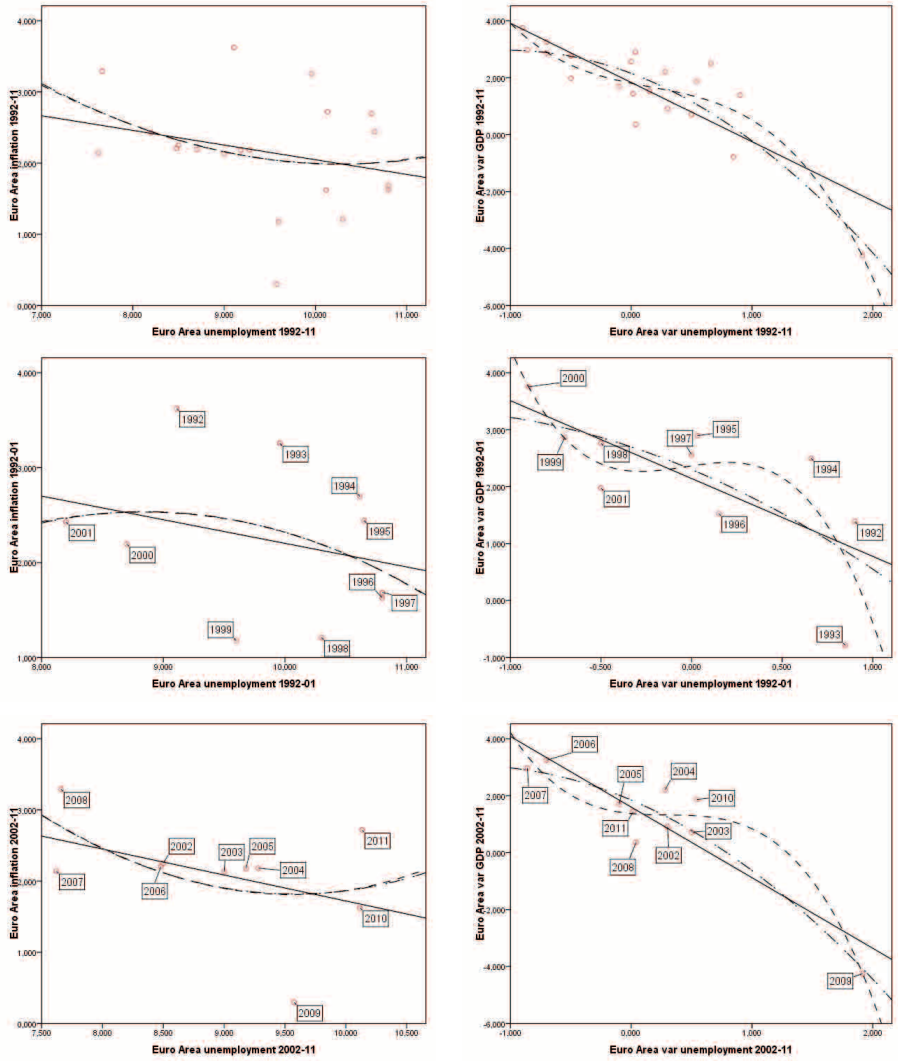
Table 1. Regression model summary for *G7* Countries

Dependent Variable: Inflation - Independent Variable: Unemployment										
Equation		*Model Summary*					*Parameter Estimates*			
		R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
1980 - 2011	*Linear*	0,029	0,897	1	30	0,351	7,012	-0,565		
	Quadr.	0,059	0,914	2	29	0,412	40,81	-10,63	0,739	
	Cubic	0,059	0,914	2	29	0,412	40,81	-10,63	0,739	0
1980 - 1995	*Linear*	0,124	1,982	1	14	0,181	14,34	-1,433		
	Quadr.	0,391	4,171	2	13	0,04	140,5	-39,4	2,824	
	Cubic	0,391	4,171	2	13	0,04	140,5	-39,4	2,824	0
1996 - 2011	*Linear*	0,251	4,699	1	14	0,048	4,838	-0,456		
	Quadr.	0,255	2,23	2	13	0,147	1,273	0,595	-0,076	
	Cubic	0,257	2,243	2	13	0,146	2,346	0	0,028	-0,006

Dependent Variable: var GDP - Independent Variable: var Unemployment										
Equation		*Model Summary*					*Parameter Estimates*			
		R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
1981 - 2011	*Linear*	0,704	68,89	1	29	0	2,491	-2,37		
	Quadr.	0,726	37,05	2	28	0	2,619	-1,837	-0,467	
	Cubic	0,752	27,24	3	27	0	2,393	-1,775	1,073	-0,764
1981 - 1995	*Linear*	0,769	43,21	1	13	0	2,96	-2,109		
	Quadr.	0,776	20,79	2	12	0	2,874	-2,312	0,324	
	Cubic	0,809	15,56	3	11	0	2,67	-1,89	1,704	-1,211
1996 - 2011	*Linear*	0,777	48,86	1	14	0	2,045	-2,583		
	Quadr.	0,812	28	2	13	0	2,229	-1,622	-0,627	
	Cubic	0,841	21,09	3	12	0	2,551	-1,945	-3,873	1,563

Source: Our elaboration on IMF data

Figure 2. The dependence of the empirical relationships of Phillips and Okun for the *Euro Area*, 1992-2011



Source: Our elaborations on IMF data

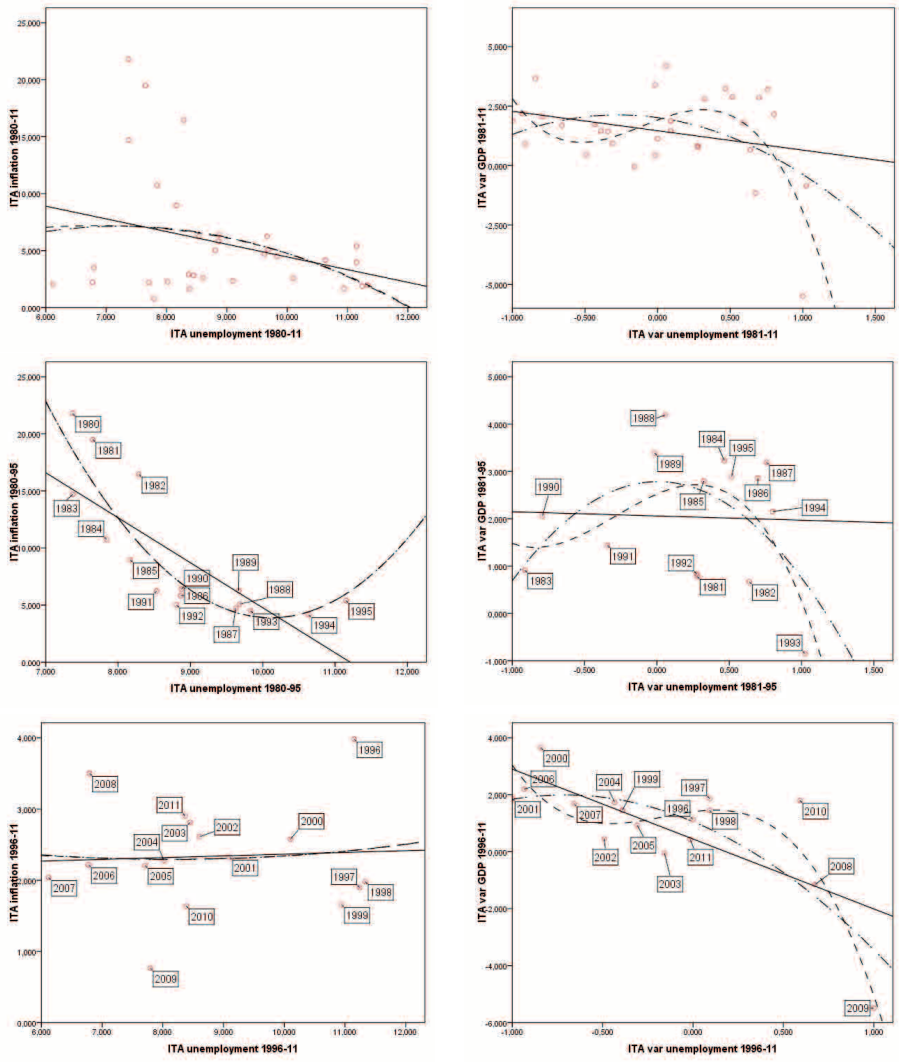
Table 2. Regression model summary for the *Euro Area*

Equation		Model Summary					Parameter Estimates			
		R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
1992 - 2011	*Linear*	0,071	1,376	1	18	0,256	4,107	-0,206		
	Quadr.	0,087	0,814	2	17	0,459	13,091	-2,16	0,105	
	Cubic	0,088	0,816	2	17	0,459	10,212	-1,204	0	0,004
1992 - 2001	*Linear*	0,08	0,696	1	8	0,428	4,691	-0,249		
	Quadr.	0,097	0,375	2	7	0,7	-10,337	2,909	-0,164	
	Cubic	0,096	0,373	2	7	0,702	-5,272	1,325	0	-0,006
2002 - 2011	*Linear*	0,179	1,742	1	8	0,223	5,368	-0,365		
	Quadr.	0,236	1,081	2	7	0,39	25,382	-4,921	0,257	
	Cubic	0,24	1,103	2	7	0,383	19,122	-2,717	0	0,01

Dependent Variable: var GDP - Independent Variable: var Unemployment										
Equation		Model Summary					Parameter Estimates			
		R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
1992 - 2011	*Linear*	0,677	37,662	1	18	0	1,832	-2,08		
	Quadr.	0,767	27,955	2	17	0	2,152	-1,591	-0,78	
	Cubic	0,813	23,188	3	16	0	1,805	-0,857	0,405	-0,844
1992 - 2001	*Linear*	0,508	8,275	1	8	0,021	2,142	-1,367		
	Quadr.	0,52	3,791	2	7	0,077	2,3	-1,333	-0,417	
	Cubic	0,613	3,168	3	6	0,107	2,365	0,48	-0,351	-2,89
2002 - 2011	*Linear*	0,81	34,209	1	8	0	1,599	-2,48		
	Quadr.	0,878	25,086	2	7	0,001	1,846	-1,802	-0,672	
	Cubic	0,92	22,923	3	6	0,001	1,372	-0,396	1,156	-1,295

Source: Our elaboration on IMF data

Figure 3. The dependence of the empirical relationships of Phillips and Okun for Italy, 1980-2011



Source: Our elaborations on IMF data

Table 3. Regression model summary for Italy

Equation		Model Summary					Parameter Estimates			
		R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
1980 - 2011	*Linear*	0,088	2,879	1	30	0,100	15,578	-1,114		
	Quadr.	0,103	1,667	2	29	0,206	-9,105	4,495	-0,311	
	Cubic	0,100	1,607	2	29	0,218	0,470	1,469	0,000	-0,010
1980 - 1995	*Linear*	0,589	20,063	1	14	0,001	44,204	-3,944		
	Quadr.	0,782	23,304	2	13	0	203,607	-39,49	1,952	
	Cubic	0,782	23,304	2	13	0	203,607	-39,49	1,952	0
1996 - 2011	*Linear*	0,003	0,042	1	14	0,841	2,121	0,024		
	Quadr.	0,005	0,034	2	13	0,966	3,235	-0,232	0,014	
	Cubic	0,005	0,032	2	13	0,968	2,838	-0,100	0,000	0,001

Dependent Variable: var GDP - Independent Variable: var Unemployment										
Equation		Model Summary					Parameter Estimates			
		R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
1981 - 2011	*Linear*	0,076	2,369	1	29	0,135	1,461	-0,816		
	Quadr.	0,161	2,693	2	28	0,085	2,012	-0,841	-1,547	
	Cubic	0,374	5,372	3	27	0,005	1,909	2,303	-1,467	-4,673
1981 - 1995	*Linear*	0,001	0,018	1	13	0,896	2,058	-0,089		
	Quadr.	0,241	1,908	2	12	0,191	2,782	0,031	-2,063	
	Cubic	0,286	1,47	3	11	0,276	2,519	1,313	-1,649	-1,923
1996 - 2011	*Linear*	0,505	14,261	1	14	0,002	0,445	-2,455		
	Quadr.	0,616	10,405	2	13	0,002	1,056	-2,642	-1,859	
	Cubic	0,798	15,831	3	12	0	1,401	0,819	-2,413	-4,871

Source: Our elaboration on IMF data

The application of the three models for the estimation of dependency (figures 1-3) showed a clear persistence of the expected relationships inspired by the original contributions of Okun and Phillips.

For the three cases considered the first report, between unemployment and inflation, shows a clear reversed trend, as expected. The only situation in which this relationship is not fully complied

with, because of the presence of outlier cases, is for the second period (1996-2011) in Italy, in particular for the data of 1996, with high levels for both variables and for the period 1997-99, with average levels of inflation accompanied by very high unemployment.

The second relationship, between the variation of the GDP and the variation in unemployment rate, outlines a substantially linear function for the first two groups of Countries, but despite being respected in general, shows a less clear trend for Italy.

The tables (1-3) display the synthesis values of the estimation models used to describe the adaptation of the three models to the observed values and then test for the dependence between variables as previously described. The *G7* group of Countries, that is a large and important economic aggregate, as anticipated, shows good signs of adaptation especially for the report of Okun. The other relationship of dependence of the rate of inflation from the rate of unemployment indicates a value of *R square* always very low, as is also low the significance of the models. From this relationship we did not expect a good fit of the linear function, but are noted clear differences in the trends of the periods 1980-95 and 1996-11. In the first case the quadratic and cubic models estimate better the observed data due to abnormal values as the years 1980-81, in which medium-low values of unemployment (5-6% with an average of 6,64% during 1980-2011) corresponded to very high values of inflation (percentage increase of the average consumer price of more than 10%), and then in 1982-83 with high values of unemployment (7,7 to 8%) corresponded to high levels of inflation, between 4 and 7%. In the second period the report follows a more linear trend, but with low significance. However, it is important to note that the estimation models of the two periods taken separately provide estimation results significantly better than the entire time series. The "splitting" due to socioeconomic changes of the Net Economy has therefore clearly delineated two trends that, when viewed together, are partially in contrast in the patterns and therefore do not allow a clear understanding of the phenomena. It is more interesting the relationship inspired by the original writings of Okun, for which the aggregate of the *G7* Countries provides clear evidence of the persistence of the report. In this case the value of *R square* is

always high with a good significance, confirming the good estimation of the various models. Furthermore, as expected, quadratic and cubic models have an almost linear trend, especially for the 1981-95 case, while is less for the period 1996-11, because there is an outlier case in 2009, influenced by international economic crisis, a sharp decline in GDP of 4,04%, much more pronounced of the trend, and a strong increase in unemployment over the previous year, grew from less than 6 to just over 8%. As for the variables of the Phillips relation, also in this case the division of the time-series in 1995 shows an improvement in the understanding of the relationship. In particular from 1996 the estimated line is more tilted and moved downward. For both reports the values of 2009 push down the prediction functions, but we can say that the values of variables are more collected in the second period, after 1996, levels of unemployment and inflation are close together and at average lower levels than in the past. We can say that relations are respected in the period post 1995, even though have been formulated in previous decades.

The second group, the *Euro Area*, presents an estimate of the models substantially similar to that of the *G7*. In this case the linear function of the Phillips relationship is even less inclined (while remaining negative tilted) because of the scattering data. In particular we note that in 1999 the unemployment rate was 9,6% with a percentage increase of the average consumer price of 1,18%, while in 1992 with a similar level of unemployment (9,11%) was recorded a value of the variable inflation of 3,62%. These values affect the scarce significance for the period 1992-2011, while for the period 2002-11 are the values of 2009 to get away from the trend, caused by the effects of the economic crisis, with an average value of unemployment but extremely low inflation, close to 0. With regard to the relationship of Okun instead the models show markedly better adaptation to the data. We must highlight the second series considered (2002-11), therefore after the start of the circulation of the Euro as single currency, with an *R square* of the linear and cubic models of 0,81 and 0,92. The function referred to the 2002-11, in addition to a better explanation of the data, is more inclined than the previous one, and comes to substantially cover, and then explain, even the extreme case of 2009. This means that the relationship between unemployment

and inflation is strong and the European system is not immune from the crisis, but it succeeded in control the variation of these important socioeconomic variables, therefore limiting the external influence and direct it to situations in line with planned trips.

For the Italian case the significance of the models is very low and the relationship between unemployment and inflation has two different patterns before and after 1995. In the first period there is a good approximation of the quadratic function (*R square* of 0,782 and good significance) and confirmed the inverse relationship in the values of the two variables. After 1996 is no longer observed a defined trend, and for a change in the value of the average consumer price almost always between 1 and 3 percentage points, the unemployment rate ranged from 6% (2006-07) to nearly 12% (1997-99). Essentially maintaining stable levels of inflation, except for a few years, unemployment was reduced gradually, before returning to get worse after 2008. The variables of the relation of Okun have instead shown different periods of the Italian economic development, especially before 1995. In Italy same of the major increases in GDP in the first period (1984 and 1987) have occurred along with increases in unemployment, while after the 1995 the relationship seems to have stated steadily on a trend of inverse relationship for the two variables. The international influences (see Paldam, 1980) certainly are for a single economic system, especially if limited in size, of great importance in explaining values not predictable and not explained by internal events.

Considering the changes that have occurred since the advent of the Net Economy, most interesting is the *G7* aggregate, due to its composition. If we consider, for each Country, the average levels of unemployment in the period (15 years) before and after the 1995 this fell by 1-3 percentage points in the Countries where the two empirical relationships have been most studied and are historically strongest, U.S.A., Canada and U.K., increased in the other four. The average unemployment rate of the 15 years after 1995 is varied than the level 1980-95 between the increase of 1,99 points for Japan (scoring 4,55% in 2011) and the fell of 3,47 points in the U.K. (while remaining in 2011 to 8%). If we consider the average rate of inflation, this was reduced in all Countries, becoming half or less for all, especially for Italy where it has

gone from an average of 9,12% (1980-1995, with peak in the early 80s) to 2,34% (1996-2011). For all Countries the indicator of inflation fell in 2009, moving from 1-4% to just above 0 for many, and -1,35% for Japan. The last variable, the rate of annual change in GDP, always considering the averages before and after 1995, had different trends: strong decrease for Japan (the average diminished from 3,55% to 0,70%), mild increase for U.K. and Canada, and little decrease for others. Countries with more stable positive trend, despite the economic crisis, are U.S.A, Canada and U.K., but among the *G7* nations, Germany seems to have responded better after 2009 (over 3% growth in 2010 and 2011) and by controlling inflation and reducing unemployment.

4. Conclusions

In this paper we considered the relationships between the economic variables inflation, unemployment and GDP exploiting the original relationships of Phillips and Okun. The idea of our paper is to use, for explanatory purposes, the two reports, the Phillips Curve and the Okun's Law, simultaneously, with the further aim to deepen our analysis in different time periods, particularly after the rise of the so-called Net Economy. The estimation models applied to IMF data (1980-2011) confirmed that the reports for the major economic aggregates considered, *G7* and *Euro Area*, are certainly existing and well explained. Our analysis were specifically divided over time periods that took into account the 1995 as a discriminator for the *G7* (the birth of the Net Economy), and 2002 for the *Euro Area* (introduction of the monetary circulation of the single European currency). From the division into two periods it was found that the years chosen as discriminating factor effectively can draw two dissimilar paths of economic variables involved, in their relations of mutual dependence and influence. The *G7* group, including U.S. and Canada, shows a clearer relationship of dependence between variables, as already provided in the literature (Moosa, 1997), found since these reports are studied (Rees, 1970). For the two important economic aggregates, however, the original assumptions of Phillips and Okun are always respected, while the reports are weaker if we consider an economic environment of a smaller scale, such as

Italy. There are clear differences between the legislation in particular in the work field between U.S. and Europe, and considering only Italy these differences are more pronounced, with particular reference to the rigidity of the labour market. The values representing the *Eurozone* still originate from Countries distant from each other in economic terms, for example on values in unemployment and economic vitality. The diversity of European Countries are reflected in our evaluations as well as in studies that have found the difficulties of a common policy for Countries (and areas) yet different from each other (Mayes and Viren, 2002; Aguiar and Martins, 2005, for the *Euro Area*).

In addition to the abovementioned years of significant events, to have a substantial weight in our analysis were those following the financial and economic crisis of 2008, in particular the very negative values of all variables recorded in 2009. The effects of the crisis were strong enough to "push down" all the models considered in the estimation of dependence of the data.

The results of our analysis have fulfilled the expectations on the validity of the division of time-series before and after 1995, since the two time periods are more explanatory of the phenomena, thanks to the socioeconomic changes that have occurred on the variables under examination.

The confirmation of the relations established by the Phillips Curve and the Okun's Law in the Knowledge Economy and in a new currency area, as the *eurozone*, refers to the theoretical foundations of these relationships proposed by Lipsey (1960, 1965, 1978) and Samuelson (1961; Samuelson and Solow, 1960). These Authors interpret the unemployment rate as an indicator of aggregate demand. It could therefore be argued, based on the results of our applications, that the general stabilization of prices for long time realized both in the *eurozone* and in the *G7* area, accompanied by a weak or otherwise inadequate aggregate demand, has resulted in high rates of unemployment. In the *eurozone* these findings were even more significant due to the combined effects of the emergence of the Net Economy (that has improved the labor productivity) and restrictive monetary policies adopted to support the birth of the Euro.

If we consider the theory of mark-up, according to which firms don't set prices of sale at marginal cost, but adding a profit margin on

unit cost, the results of our research would demonstrate that there was considerable scope for any intervention of economic policy tending to improve levels of employment without necessarily lead to higher prices, both in the short and in the long term.

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Rohitha Goonatilake[*] - Rafic A. Bachnak[**] - Asela Acosta[***]

THE ROLE OF DEBT AND CURRENCY IN THE GLOBAL FINANCIAL CRISIS

Abstract

When the Euro was established, it was intended to favor and solidify the economy of Europe. Soon afterward, the Euro gained ground against the US dollar and other currencies. Meanwhile, the world suffered extremely slow economic growth, and as a result, the debt crisis started to emerge. This article attempts to give a glimpse into the factors associated with the crisis that led to the current situation and to follow through its path to the present crisis, since it does not seem easy to repair. Additionally, the causes for building up into a large internal debt will be analyzed as the situation was the root cause for this grave uncertainty. The models used to make economic forecasts in the past can shed some light to economists by pondering possible causes to the inception of the crisis that currently affects the state of the world economy.

JEL Classification: F41; H50; H62; M21; O23; P25

Keywords: Debts, Stocks, Properties, Budget Deficit, Imf, Currencies, Investment

1. Introduction

The current slow economic recovery has gradually become stagnant as a result of the European debt crisis and financial turmoil. Some countries

[*] Department of Engineering, Mathematics, and Physics, Texas A&M International University, Laredo, Texas 78041-1900, USA, E-mail: harag@tamiu.edu.
[**] Department of Engineering, Mathematics, and Physics, Texas A&M International University, Laredo, Texas 78041-1900, USA, E-mail: rbachnak@tamiu.edu.
[***] Department of Engineering, Mathematics, and Physics, Texas A&M International University, Laredo, Texas 78041-1900, USA, E-mail: asela.acosta@tamiu.edu.

such as Portugal, Iceland, Greece, and Italy became the first victims of several waves of economic downturn. Unemployment, increased cost of living, stock market tumbles, rise of personal and other debts in general, and the expansion of poverty levels are commonly seen among these countries. In fact, the actual value of stocks and real estate properties began to diminish as a result of this weathering economic downturn. Furthermore, the heavy borrowing of industrialized countries, particularly those in Latin America have resulted in a prolonged and unsustainable financial crisis indicating that some debtor nations might not be able to continue making payments on their loans, etc. The crisis triggered countries like Mexico, Brazil, Argentina, and Poland to announce that they did not have liquidity to pay their creditors and, as a result, to raise the threat of defaulting on their loans. The debt crisis will pose a threat not only to the national upbringing and the political instability among the indebted nations but also, to the international monitory system itself. For the discussion of this article, we quantify the debt crisis if the amount of debt is in the neighbourhood of its national GDP.

As the European crisis unravels, it could shed some light onto the situation. Several instances from the past that show how the situation can be eased from lessons learned from these particular events can be cited. Further, some effects are explained with the use of microeconomic theories which basically study how the market operates by essentially understanding the economic systems.

Since the volatility of the current stock market appears to be too high, it aggregates in relation to other broader measures such as GDP, which are quite substantial and significant. However, they are not out of line by prevailing fluctuations of cash flow holdings by corporations that pay all their expenses to satisfy all of the outside claimants including government agencies (Hall, 2001). The determination of stock prices include the price of an asset that reflects the value of both future pay-outs earned by holding that current asset, and possible increases in the price of the particular asset. The significance of the future price of an asset for its current price provides a dynamic element into pricing of assets. The efficacy of a given change is comparable to the present values. Subsequently, stock prices move rapidly in response to dividend and expected stock prices under volatile market conditions.

Personal and household debt expands during economic calamity. At the same time, the value of stocks are lowered and devalued causing the housing and property markets to collapse. In terms of mortgages, loans, and credit card debts, all consumers seem to have accumulated personal and household debt. Industry performance declined causing unemployment and their stock prices to plunge. The market demands funds from borrowers for expansion and additional investment opportunities. To a borrower, a higher interest rate has an income and substitution effect that discourages the level of desired borrowing from lenders. Therefore, higher interest rates make it more expensive to finance increased consumption from borrowed funds. Increased government spending and rise of unemployment bring less revenue that undergoes heavy budgetary deficits and ripening conditions for inflation.

2. Major Currencies and GDP

Major currency unions have dominated the world causing tension amongst them. The growing importance of the US dollar was a somewhat noticed event at the beginning of the 20th century. The European Union (EU) is a unification of 27 member nations that are presumed to create a politically and economically united community throughout Europe. The Euro became huge news later in the century when it was introduced by EU. One of the largest steps toward European unification took place with the introduction of Euro as the official currency in eleven countries that included, Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain on January 1, 1999. However, the first European Union countries that adopted the Euro did not begin using it until January 1, 2002. It created change of currencies in the whole currency map. As a result, the Euro instantly became the second most important currency in the world. The Euro, in the meantime, as opposed to the US and Canadian dollars, has gained ground. Presently, the Euro is one of the world's most powerful currencies, used by more than 320 million Europeans in twenty-three countries. The countries using Euro are: Andorra, Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Kosovo, Luxembourg, Malta, Monaco,

Montenegro, Netherlands, Portugal, San Marino, Slovakia, Slovenia, Spain, and the Vatican City. Japanese yen, on the other hand, dominated in Asia along with their overseas transactions.

A treaty drafted to save the Euro split the UK from Europe in the later part of 2011. The United Kingdom (UK) abandoned being a signatory to the treaty to save the European debt crisis. The UK stood defiantly against this historical treaty by rejecting demands for treaty change across the EU as part of a rescue plan introduced to save the single currency. This unprecedented move surprised the world putting the UK's future in the EU into serious doubt as it maintains their currency as the UK pound. The parity rate comparison against UK pound, US dollar (USD), and Canadian dollar is done to bring this point to the attention in Figures 1, 2, and 3.

Figure 1. UK pound rates vs. USD

Source: http://www.exchangerate.com/currency-charts/USD/GBP/from//to/

Figure 2. Canadian dollar rates vs. USD

Source: http://www.exchangerate.com/currency-charts/USD/GBP/from//to/

Figure 3. Euro rates vs. USD

Source: http://www.exchangerate.com/currency-charts/USD/GBP/from//to/

Figures 1, 2, and 3 also show there were greater volatilities due to many reasons; one of them being its direct effects on commodity markets. It is seen that the US dollar is devalued over the period; therefore, giving unfair advantages to the US economy. Some argue this is as a result of globalization. Another reason is the internal debt associated with major countries including the US. The US debt percentage of GDP is nearly 100% so it is not to be included in the top 10 countries with worst debt-to-GDP ratios listed in Table 1.

Table 1. Current debt of ten major countries as percentages of its GDP

Country	Debt as Percent o GDP (2010 est.)	Population in 2010 (millions)	Geographical Area (Sq. Miles)
Japan	225.9	126,475,664	145,882
St. Kitts and Nevis	196.3	50,314	101
Lebanon	139.0	4,143,101	4,015
Jamaica	135.7	2,868,380	4,244
Greece	130.2	10,760,136	50,942
Eritrea	129.7	5,939,484	46,842
Grenada	119.1	108,419	133
Italy	118.4	61,016,804	116,305
Iceland	115.6	311,058	39,768
Barbados	111.6	286,705	166

Source: http://www.tradingeconomics.com

Many countries with such high debt percentages of GDP, for instance, the Caribbean nations of Jamaica, and Barbados, are not among the world's economic superpowers. A more relevant consideration is to look at the United States debt situation within the context of other largest world economies. Among the 10 countries with the largest GDPs, the US ranks third in terms of debt as a percentage of its GDP, only behind by Japan and Italy. One major outlier on the list is China, whose 2010 GDP is estimated to be the world's second-largest, at $5.7

trillion. However, its debt is only equal to 19.1 percent of its GDP, which is well below all other major world economies.

Table 2. Debt as percent of GDP of all other major world economies

Country	GDP (2010 est., USD)	Debt as Percent of GDP (2010 est.)	GDP Growth Rates (2011 Q3)
United States	$14.6 trillion	92.7	1.5%
China	$5.7 trillion	19.1	9.1%
Japan	$5.4 trillion	225.9	-0.7% (negative growth)
Germany	$3.3 trillion	75.3	2.5%
France	$2.6 trillion	84.2	1.6%
United Kingdom	$2.3 trillion	76.7	0.5%
Italy	$2.0 trillion	118.4	0.2%
Brazil	$2.0 trillion	66.8	2.1%
Canada	$1.6 trillion	81.7	3.4%
Russia	$1.5 trillion	11.1	4.8%

Source: IMF World Economic Outlook Database, October 2010

Currency manipulation or currency wars harm fair trade practices, thus making some countries have unfair advantages while putting forward drastic economic reforms. It is important to believe that Europe is going to get into the business of counterbalancing China in many ways. Europe as a whole has few strategic interests in Asia as they are trying to establish an economic power. At the same time, they would see China as an emerging market for their products and services. This would be a serious setback to the US. All nations balance against economic threats, and one advantage for this threat is its geographic proximity. If the US decides to balance China it needs all possible allies to help it accomplish that task, by wanting them to be in Asia not in Europe or elsewhere. In addition, there are four newly industrialized Asian economies, namely, Hong Kong SAR, Singapore, Korea, and

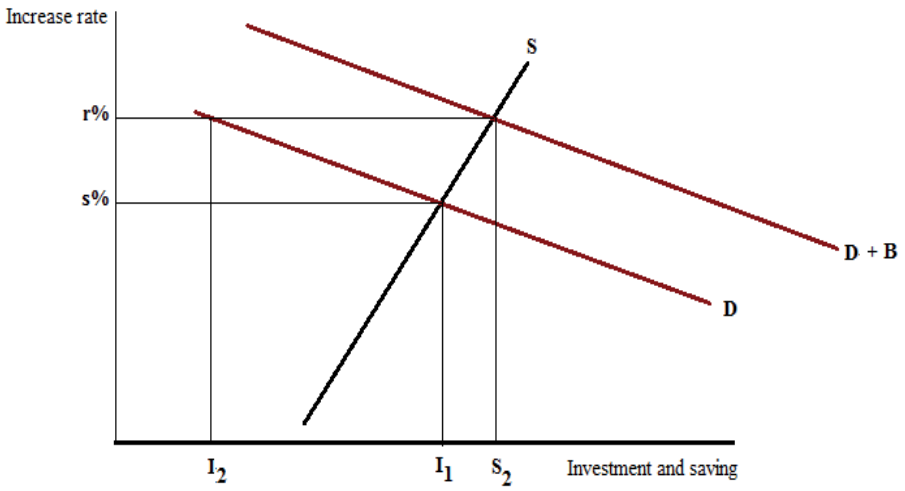
Taiwan Province of China. They are apparently doing better in this turbulent economy by becoming partners to everyone.

3. Causes of Debts

In the perspectives of Americans, citizens live under three major forms of government: the federal, the state, and the local governments. There are both benefits and costs involved for living under these forms of government. Many of the benefits enjoyed are under the federal government. Some of the major services the federal government provides are national defences, healthcare (Medicare for the elderly), food stamps, social security, and public education for the younger generation. Some of the costs Americans pay to the federal government are personal income taxes (progressive tax), social security contributions (payroll taxes by both employee and employer), and sales and excise taxes (when purchasing items and commodities). The main benefit that the state government provides to its citizens is public education, among many others.

Government overspending and wartime expenditures have largely contributed to the current debts of the US. Unsustainable export and import deficits contributed to the crisis as well. The US federal government has operated with a deficit in every year except for two times since 1957. In 1983 the deficit exceeded $200 billion for the first time in the US history. Most forecasts projected that deficits would remain at that size or grow through 1989 unless taxes were raised or expenditures were reduced drastically. The same goes with current public sentiment and prevailing wisdom.

Figure 4. Effects of deficit financing

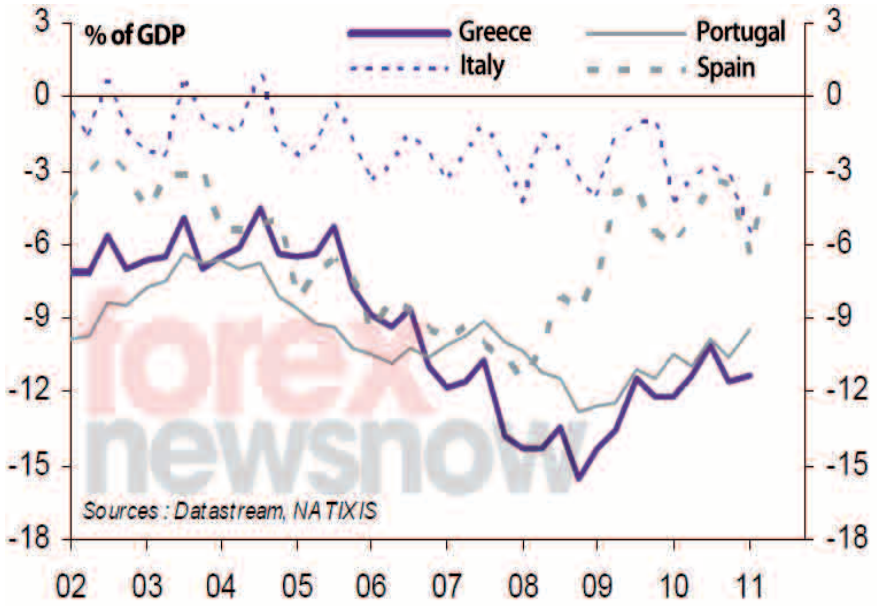


For a particular investment demand curve, the more sustainable the supply curve (S), the more the private investment will fall as a result of government borrowing (Browning & Browning, 1986). Figure 4 shows that if the government borrowed $B to finance the deficit $D, the corresponding expenditures shifts the demand curve for additional funds supplied by the savers to $(D + B). As a result, interest rate, s% is bid up to the rate of r% and private investment inclined at the same time. The reason for which the public worries about the deficits is that the cost of financing the government expenditure due to borrowing is ultimately a burden on them in the future. It is currently in the tune of $15.2 trillion. For Europe, Figure 5 the negative trade deficits have been seen in Greece, Portugal, Italy, and Spain. This may have led to their debt crises. The fact that the government competes with private borrowers when borrowing funds from servers, results in higher interest rates and a decrease in private investment as anticipated.

As countries depend on import products (such as oil), the impact of the changes in the prices and their local consumption on trade balances can explode; but there are remedies to offset the changes. This amounts to the fund's projection of the aggregate current deficit of (nonoil) market, compound rates, debt and income. Debt is generated by the gap between

domestic saving and prices paid on the imports that also contributed to internal debt (Solomon, Greenspan, Kareken, and Ohlin, 1977).

Figure 5. Trade deficit as a percentage of GDP for Greece, Portugal, Italy, and Spain



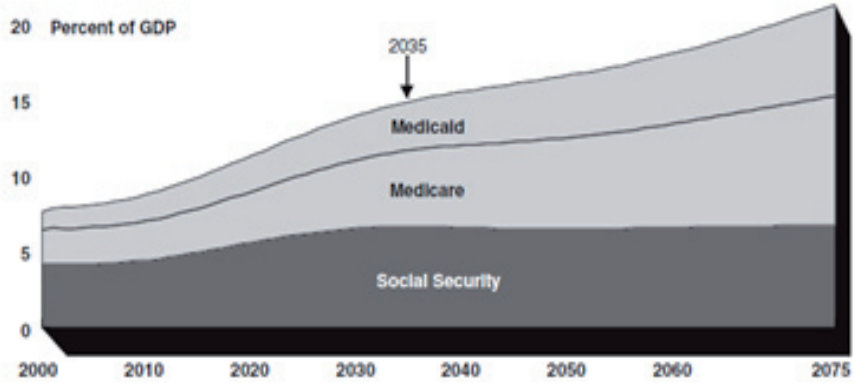
Global financial crises hit some countries harder than the others leading to their economic slow-down. Accordingly, Greece, Iceland, Portugal, and Italy's troubles resulted in austerity measures introduced to them by world bodies. These three countries have suffered major financial crises lately and all of them have government debts that far exceed their annual projected GDPs. Appropriate austerity measures need to be placed in the intent to ease the crisis.

4. Increasing Demand for Entitlements

The aging baby boom generation has demand for entitlements such as social security and Medicare, as well as long-term care services that have many challenges on the federal and state budgets. In the long run,

this will lead to a rapid growth in federal entitlement spending in the absence of a meaningful reform to offset an unsustainable burden on future generations and the federal budget. For example, on August 14, 1935, the Social Security Act established a system of old-age benefits for workers, benefits for victims of industrial accidents, unemployment insurance, aid for dependent mothers and children, the blind, and the physically handicapped. The benefits are actually composed of two equal payroll taxes, one collected from the employer and the other from the employee. This large entitlement program together with Medicare provides a safety net for adults and older generations. It also contributed to the unprecedented internal debts in the US. However, when many baby boomers began to retire, the burden of the social security tax became considerable. According to Figure 6, it is projected that Federal spending for Medicaid, Medicare, and social security will double as a share of GDP by 2035. The estimates do not include the state share of Medicaid expenses. These projections were based on intermediate assumptions of the 2001 old-age, survivors, and disability insurance, hospital insurance, and supplementary medical insurance trustees' reports and the 2002 long-term Medicaid projections by the Congressional Budget Office's (CBO).

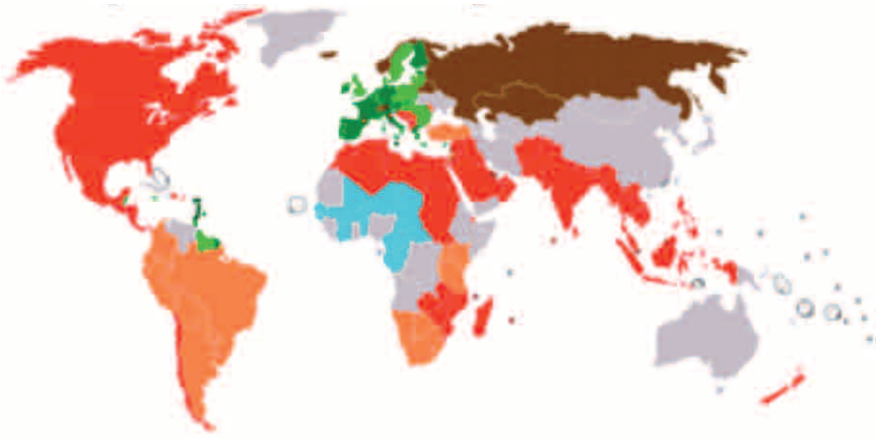
Figure 6. Projected federal spending for Medicaid, Medicare, and social security



Source: Office of the Actuary, Centres for Medicare and Medicaid Services; the Office of the Chief Actuary, Social Security Administration; and CBO

Countries such as Brazil, China, India, Indonesia, Israel, Japan, Korea, Malaysia, the Philippines, Singapore, South Africa, Switzerland, Taiwan, and Thailand have recently engaged in exchange markets and capital controls that could curb appreciation of currencies. This would easily provide a weaker rate of one country influencing the stronger rate(s) of another country or countries (Cline and Williamson, 2010). This has already resulted in economic integration and currency regions around the world as seen in Figure 7. Each country has been coloured according to the most advanced agreement that it participated into the stages of economic integration.

Figure 7. Stages of economic integration around the World



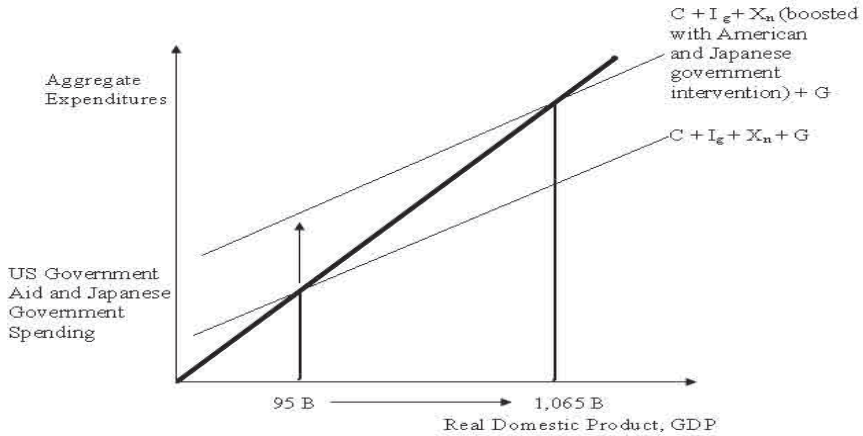
Colour	Economic Integration and Currencies
Green	Economic and Monetary Union (CSME/EC$, EU/€)
Yellowish Green	Economic Union (CSME, EU)
Blue	Customs and Monetary Union (CEMAC/franc, UEMOA/franc)
Brown	Common Market (EEA, EFTA, CES)
Pink	Customs union (CAN, CUBKR, EAC, EUCU, MERCOSUR, SACU)
Red	Multilateral Free Trade Area (AFTA, CEFTA, COMESA, GAFTA, GCC, NAFTA, SAFTA, SICA, TPP)

Source: www.oup.com/uk/orc/bin/9780198742869/ch01.pdf

5. Previous Global Financial Crises

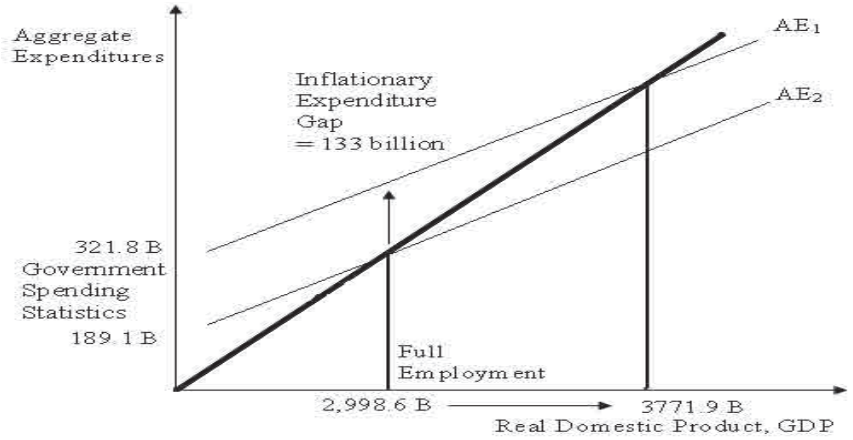
Some argue that to an extent, the recent turbulence in global financial market has been caused by inadequate understanding of sophisticate financial modelling (Shreve, 2005). Glimpses of some crisis that led to inflation are provided below to show that the scenarios under which the recovery was possible with the hope that the current crisis can be soon understood, learned, and subsequently eased. Three main examples, the Japanese Growth Miracle, Vietnam War Inflation, and the Great Depression are discussed in order to bring this point to an attention. Presently, the IMF (International Monetary Fund) provides monitory support to relieve the financial crisis of a country in order for them to have strong footing as the country takes drastic economic reforms to improve the situation. The IMF is an organization comprised of 187 countries, working towards fostering global monetary cooperation, secure financial stability, facilitate international trade, promote high rate of employment and sustainability of their economic growth, and to assist the reduction of poverty around the world. If the IMF was to provide assistance, then the country would be in need of tightening belts by taking strict measures such as curbing expenses while sustaining through these assistances for improving the situations.

Figure 8. Theory behind Japanese growth miracle



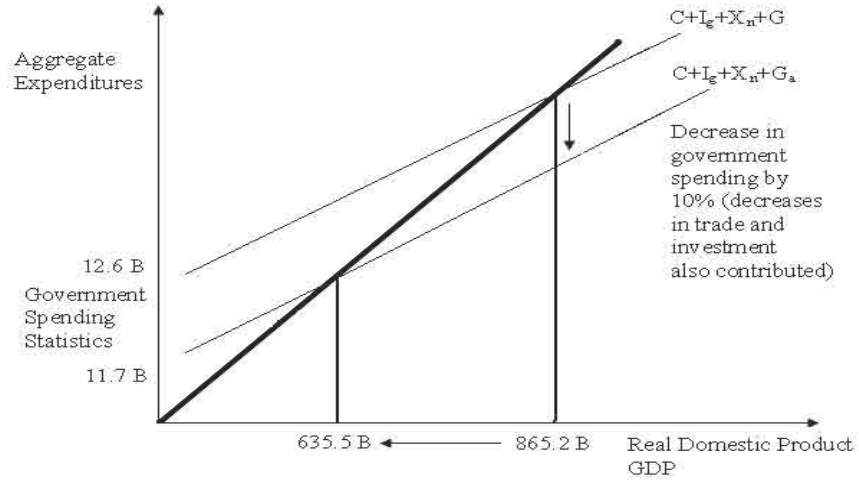
The Japanese Growth Miracle is the historical event where Japan regained economic growth after World War II (WWII), contributed by US investment and because of the Japanese government economic intervention through their Ministry of International Trade and Industry (MITI). After WWII, business-related burdens made it look like Japan was headed for economic catastrophe. It was thought that economic development could democratize Japan and would be incapable of preventing the re-emergence of militarism as a way to stop communism. The US government paid the Japanese government large sums for military procurement equivalent to 27% of Japan's total export trade. The Japanese economy hit a recession when the US stopped payments and started recovering afterword. By the late 1960s, Japan had risen from the aftermath of WWII to achieve an astoundingly rapid and complete economic recovery. The Japanese government contributed to the economic miracle by stimulating the growth of private sectors. MITI made the Japanese government and private industry prevent the flooding of Japan's markets by foreign goods. It also regulated all imports with the abolition of the Economic Stabilization Board and the Foreign Exchange Control Board in August 1952. The MITI boosted the industrial sector by untying the importation of technology from the import of other goods. In 1965, Japan's real GDP was estimated at just over $91 billion. Fifteen years later, the real GDP had soared to a record of $1.065 trillion by 1980. By the early 70's, the GDP was growing at a phenomenal rate of 13.9 percent despite a large protected domestic economy. As seen from Figure 8, Japan had all the components of GDP, but both the US aid and the Japanese government spending assisted the recovery.

Figure 9. Government intervention to curb Vietnam War inflation



The inflation occurred during the 1960's in the United States, is a classic example of Demand-Pull Inflation. This type of inflation is the worst kind because the economy cannot fix itself. The government must intervene immediately if this happens. The escalation of the Vietnam War had resulted in a 40 percent increase in defence expenditures between 1965 and 1967 and another 15 percent increase in 1968. The increase of the government's spending shifted the economy's aggregate demand curve to the right, which produced the worst inflation in two decades. Actual GDP exceeded potential GDP, and inflation jumped from 1.6 percent in 1965 to 5.7 percent by 1970. Figure 9 showed that the government had an inflationary expenditure gap of about 133 billion dollars. The equilibrium exceeded full employment levels, and as a result, the government had a hard time coping with it. Subsequently, aggregate expenditure went up triggering a large scale unprecedented economic recovery.

Figure 10. Dramatic economic downturn leads to great depression



The Great Depression was a dramatic economic downturn that began in 1928 associated with the stock market crash of 1929. The Great Depression was not a sudden total collapse. The stock market turned upward in early 1930, but returned to the levels of 1929 by April of that year and almost dropped 30 percent below the peak of September 1929. In early 1930, credit was available at low rates; however, people were reluctant to add new debt by borrowing. Conditions were worse in farming areas because prices plunged, and in the mining and logging areas, unemployment was high and there were few jobs. People and businesses were in debt as price deflation occurred or demand for their product decreased. Layoffs caused unemployment rates of over 25%. The US Government cut back its expenditures by 10 percent. Trade declined due to increased tariffs. Government expenditures contributed to only 3 percent of the total GDP in the nation. The Great Depression went below the usual recession in the regular business cycle. Real GDP went down by about 25% from 1929 to 1933. The US Government started to decline its spending by a little more than a billion dollars. However, a billion dollars amounted to almost ten percent of total expenditure by the government. This caused the real GDP of the US to go down by

more than two hundred billion dollars thus becoming a huge problem for the US. However, after new programs and the military production during WWII, the economy recovered from the depression.

6. Conclusions

Evidently, individual country's internal debt, weak currency market, and poor performance of markets all have contributed to the present crisis. The study of recoveries from the previous global financial crisis would enable us to find a real solution to the crisis until theory provides a definite solution. However, the impact of globalization on the US economy continues to be one of the most debated economic issues discussed in favour and against the economic expansion in the past decade (Dwight, 2008). The extent of what occurred on currency and stock markets influence the other factors and vice versa providing a greater volatility of market condition for stocks that are sold and bought on a daily basis.

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Emiliano Colantonio[*] - Alessandro Crociata[**] - Antonella Perrucci[***]

FROM SOCIAL CAPITAL TO NETWORK CAPITAL: SOME EVIDENCE FOR EUROPE

Abstract

A long rich intellectual debate grew up in social sciences focusing the qualitative dimension of socioeconomic development. We based our paper within the stream of research focused on network as economic interaction in a social context. Network as socioeconomic structure could be powerful category fostering development trajectories. Hence several aspects of social life as changing of value; culture, behaviours and attitudes of people become more and more relevant: among them, social capital became a more and more debated issue. In that way the present paper analyses the firms' networks determinants by identifying the conditions for EU27 countries, by moving from social capital, as a local development driver, to network capital, as a global development driver. The methodology through which the results are obtained is the multidimensional scaling method, which allows to define relations between countries in terms of proximity/distance with respect to the considered determinants, providing a spatial representation of them.

JEL Classification: D71, R23, Z1, Z13

Keywords: Social Capital, Network Capital, Firms Network, Multidimensional Scaling.

[*] University "G. D'Annunzio" of Chieti-Pescara, Department of Economic-Quantitative and Philosophical-Educative Sciences.
[**] University "G. D'Annunzio" of Chieti-Pescara, Department of Economic-Quantitative and Philosophical-Educative Sciences.
[***] University "G. D'Annunzio" of Chieti-Pescara, Department of Economic-Quantitative and Philosophical-Educative Sciences.

1. Introduction

Since the last three decades social interactions have been replaced within the development issue by a huge stream of research programs based on social capital issue. In general social capital became a more and more debated argument by moving from the belief that the economic activity is deeply embedded in the social structure, and agents' decisions are always influenced by a wide range of social and cultural factors. Firstly discussed within the sociological boundaries (Bourdieu, 1986; Putnam, 1993; Granovetter, 1985) the concept of social capital affected also economics (among other Becker, 1974 and North, 1990; for a critical overview see Sabatini, 2005). Hence, social capital has a wide and variable definition, and the several perspectives on social capital derive from heterogeneous academic backgrounds and frameworks. An exhaustive review of the different approaches on social capital falls behind our aims; for the principal differences on the definition and measures of social capital see Helliwell (2001), Alesina and La Ferrara (2002), Sabatini (2005), Bjornskov (2007).

About the several meaning we found:

- Generalized trust, that is a measurement of trust degree among people.
- Confidence in institution, that represents people trust towards several kinds of institutions such as government, political parties, European Union, justice system, etc.
- Social network, that represents interactions among members of a social context (a sort of relationship and membership).
- Political participation, which includes active and passive participation at political parties.
- Civic awareness and social norms, is the involvement of people in social activities, such as voluntary organization, reading newspaper and watching television about local news.

Despite the social capital several dimension and despite the academic background heterogeneity, economics shows a widely acknowledge on the ability of certain aspects of the social structure to generate positive externalities able to foster competitive advantage for members of a group. Hence we recall that feature and stress, in this paper, the

positive outcomes that a social structure and the following interactions exert on firms productive capabilities. Among these outcomes: a social structure fuels the agents' interaction and consequently increases the better diffusion of trust and information. That is to say that an increase in trust-based relations reduces the average cost of transactions, just as an increase in physical capital reduces the average cost of production. Moreover the circulation of information reduces uncertainty and the free-riding effect on the market. These mechanisms were at the base of local economic development patterns (Mattoscio and Carlei, 2006; Mattoscio, 2012), providing a credible explanation for growth differentials among regions with similar endowments in terms of the other forms of capital. This kind of outcomes finds a room since Marshall (1920) and many scholars focused on externalities as emergent phenomena of agglomeration economies and as engine of growth. In literature there is consensus on the fact that geographic concentration boosts business interactions and the transmission and exchange of knowledge and ideas, skilled workers, products and processes, and so on.

We are talking about the industrial district framework that characterized the Third Italy's development model (Bagnasco 1977; Becattini 2000). About economic outcomes, we argue that they strictly depend on social and historical circumstances in which social interactions are located, that is why many marshallian scholars talk about social capital and local development. What about a wider context? We stress, in a global arena, the concept of network, as powerful socioeconomic structure able to foster development trajectories, by providing a brief discussion on its several features and definitions. As Simpson (2005) argues in a globalised context, a new type of social capital could grow up, known as "network capital". Based on collaborative practices in a global network, network capital is the expression of social capital in the Information Age, fuelled by using ICT and realizing international cooperation via electronic networks. That is why by moving from social capital, as a local development driver, to network capital, as a global development driver, the present paper analyses the firms networks determinants identifying the conditions for EU27 countries.

The paper is structured as follows. Section 2 starts with a brief overview of the topic of firms network. Section 3 provides a data analysis

using a multidimensional scaling methodology in order to identify groups of countries that show similar characteristics in relation to the chosen indicators. Finally, section 4 summarizes the results achieved by the analysis, presenting some brief concluding remarks.

2. Firms Network

Globalisation has brought undisputed changes on competitive field (Mattoscio and Colantonio, 2006; Mattoscio, Furia and Castagna, 2007): the firms' structure changes and is submitted to pressures toward innovation and continuous competitiveness. In an international markets scenario, firms networks have been increased their importance since they may accelerate the innovative process, increase the capability for continuous learning, combine some specific functions shared with others, stimulate scale economies, help to forecast trends and changes within the society for new market opportunities. As in a local context, also in a firms network scenario it occur that firms could share material and immaterial input/output, such as knowledge and information, at the basis of their performances. In that sense firms network is a set of nodes and relationships that connect and coordinate firms localized in a wide area, with a perspective of boosting for global development.

Soda (1998) argued that networks are composed of different elements: nodes, links and shared rules. Nodes can be constituted by different legally autonomous entities, such as firms, consortium, professional association, etc. These nodes interact with others in order to share energy and values. Relationships among nodes are so called "links" and can be different basing on goal and issue of relations. The object of the connection depends on the nature of the interaction; there are four different types of interactions: transactions, informative exchanges, normative exchanges and resource sharing.

Depending on the relationships purpose, there are strategic relationships, having the aim of products development or new markets entrance, and operative relationships, concerning agreements, outsourced activities and related costs.

The operational characteristics are shared rules that allow the networks success, such as standards of conduct, common language, planning and

control systems, design and innovation systems and recognized incentive systems. The planning and management are at the base of the networks success. It mainly depends on two elements: environmental factors and firm's internal context.

The network approach distinguishes two positions for firms: micro and macro (Fiocca, Snehota and Tunisini, 2009). The micro position concerns a double link inside the single relationship and it is connected to bargaining power of the two partners cooperating. The macro position is not a simple sum of the micro positions, since it expresses the role of the firm in the network towards other firms that are part of the networks. The connection between micro and macro position could be very strong and continuous, in that case self-influencing.

There are two kinds of relationship for firms: the first type are the horizontal relationships, i.e. relations with customers, in witch there are *resource pooling* processes, characterized by information and knowledge interchange and by sharing of material resources. Vertical relationships represent the second type of relationships among firms, i.e. relations with suppliers and with customers. These are characterized by *resource transferring* processes in which goods and services are exchanged.

Firms networks have different hallmarks: mutual adjustment of the parts, development of trustee attitude, ensuring reciprocity and availability in a fair sharing context of risks and benefits. In this way, Alter and Hage (1993) distinguished some types of firms networks: *competitive cooperation networks*, also known as horizontal networks and *symbiotic cooperation network*. The former kind of collaborations is established among firms belonging to the same sector, and classified in three subgroups: *competitive limited cooperation networks*, since they are based on simple relations, such as exchange of information, social and economic goods, without the need for sophisticated forms of coordination; *competitive moderate cooperation networks*, characterized by relations based on technologies, but also by economic and political activities, such as joint venture or alliances for lobbying activities; *competitive high cooperation networks*, set on complex relationships involving appropriate forms of coordination and control, also since the relationship are based on strategic content to achieve competitive objectives, as in the joint venture or in the trust. The latter kind of collaboration is represented by the *symbiotic*

cooperation network. It represents structures located among various competitive sectors, also classified in subcategories: *symbiotic limited cooperation networks*, such as exchange agreements or financial support agreements; *symbiotic moderate cooperation networks*, such as districts or partnership; *symbiotic high cooperation networks*, such as joint venture. Competitive networks differentiate from symbiotic cooperation ones basing on the higher number of subjects involved and on the presence of activity oriented towards value creation.

The firms network are a phenomenon characterized by heterogeneous features. Hence other models exist to classify these forms of cooperation. Hence firms networks can be further classified depending on the design level as *natural networks* and *governed networks*, depending on the former is characterized by the absence of legal identity and hierarchical structure but provided with structural flexibility, so called "built in". These networks assume operational, strategic and efficient conduct for the entire system and catalyse all firms, involving them to cooperate for common and shared goals. The latter is formed both by selected firms in reference to resources available and objectives they pursue. The links among firms, the investment strategies, the operative strategies and central hierarchical structure are regulated; there is a high coordination degree even if unexpected risks are not faced in all cases.

Depending on the existence of a reference centre (Butera, 1990), there are three types of firms' networks: *networks provided with a reference centre,* around which the firms orbits. The central institution becomes relations' coordinator and usually planner and controller of network's strategy. In the second category there are *networks provided with multiple reference centres,* in which the system moves around more reference entity according to the influence of relations. The third types are *firms networks without a centre*, such as districts.

Moreover, according to the legal cohesion degree the *proprietary networks* and *not proprietary networks* are distinguished. The first ones allow the link among enterprises in the networks by sharing ownership: holding, joint venture corporation and firms groups. In the not proprietary networks, the cooperation among firms is based on contractual or informal agreements (i.e. franchising or consortiums).

According to the strategic cohesion degree, there are the *diverged*

networks, the *mutual influence networks* and the *converged networks*. The diverged networks are groups of firms that pursue efficiency advantages and operational effectiveness in the short time, in the mutual influence networks, firms are mutually determining to pursue competitive strategies. The third ones represent the most appropriate organizational solution to achieve a common strategic plan.

Depending on the integration degree, there are the *complementary networks* in which the technical-productive and economic ties among firms are very strong and there is an exclusive process of economic production shared out among more legally autonomous units. The *independent networks* ignore the processes in the companies but create shared common interests.

Confalonieri (1998) and Pilati (1990) further classify the networks. Confalonieri classifies them on the basis of: leader presence, features of networks structure and features of involved firms. Pilati focuses on investment specificity and transaction frequency, classifying firms networks in function of bargaining forms.

Merli and Sacconi (1994) argue that networks structure could evolve, becoming big global networks. Hence *holonic networks* will replace the traditional networks, which express higher levels of creativity and flexibility, and so most suitable to face sudden changes in the economic environment.

The holonic networks are sets of independent firms capable of linking up among them quickly thanks to sophisticated operating systems. Firms in holonic network are defined as "value driver", their aim is to encourage customers to create value autonomously; these are "knowledge based" and mix their learning to be more competitive. Within holonic systems, the knowledge is acquired by a small number of task forces, propagating to all units in real time.

In general the firms networks are cooperative architectures, based on relations and links development, oriented to continuity and to reliability among autonomous firms. These behave and share resource to reach objectives and common interests. Firms network relationships may increase the level of development since they allow to replicate information and knowledge, and overcome the physical distance problem. The network expansion is based on important pre-conditions, fundamental

for creating stable and global relationship: opening capability, security and above all ICTs diffusion.

3. Data, methodology and results

To reach our purpose, which consists in identifying conditions for firms networks development in the European countries, we decided to adopt a multidimensional scaling analysis (MDS) which has the advantage of producing graphic representations that are easy to interpret and use.

Given a (geographical) map, it is obviously easy to calculate the (geographical) distance between the points located on the map. What MDS does is the inverse operation, that is, it finds a map which (most) plausibly has generated those distances.

The first step of MDS consists on obtaining the similarity/dissimilarity data matrix, where the generic element d_{ij} is calculated by assuming some concept of distance (e.g. the Euclidean one) between the "objects" (countries in our case). Using this information on the similarity/dissimilarity, in a second step a solution is obtained consisting of a configuration, that is the localisation of the "objects" on a space of a small number of dimensions (usually two) where the distances between the points on that space approximate, as most as possible, the similarities/dissimilarities between the "objects".

By doing so, MDS thus provides a useful graphical representation which may allow to visualise, on the one hand, how distant/dissimilar are the "objects" and, on the other hand, are indeed closer/similar to others.

In our case, MDS is a useful tool through which it is possible to produce a graphical representation of a pattern of the 27 European countries, based on the degree of similarity/dissimilarity among them, concerning the conditions for firms networks development. The resulting positioning map has the property to partition the countries into homogeneous groups, so as that the degree of association between two countries is maximal if they belong to the same group and minimal otherwise.

Since the networks expansion is based on important pre-conditions, fundamental for creating stable and global relationship, such as opening capability, national security and ICT diffusion, we considered the

following 12 indicators representing 3 sets of variables for each European country (see Table 3):

1) Opening capability
   - Persons with tertiary education attainment by age and sex (% of 15-64 years old), 2010
   - External trade of EU (export/import ratio), 2010
   - Total intramural R&D expenditure (Euro per inhabitant), 2010
   - Number of airports (with more than 15,000 passenger movements per year) (per 1000000 of people), 2009
2) National security
   - Police officers (per 1000 people), 2009
   - Crimes recorded by the police (per 1000 people), 2009
   - Prison population (per 1000 people), 2009
   - Accidents at work (per 1000 ok people), 2008
3) ICT diffusion
   - E-government availability (supply side), 2010
   - Broadband penetration rate (%), 2011
   - Frequency of Internet access: once a week (including every day), 2011
   - Internet use: interaction with public authorities (last 12 months), 2011

Data refer to the most recent year basing on their availability (source: Eurostat).

In the first step, a similarity/dissimilarity matrix was calculated using the Euclidean distance (based on the standardized variables). In the second step, this matrix was considered as an input for a MDS routine in SPSS.

Another decision to be taken in any MDS analysis is the choice of the number of dimensions in which the map is to be drawn. A way of establishing the dimensionality of the map is to produce the MDS map in six, five, four, three, two and one dimensions and observe how the number of dimensions influences the quality of the representation. A series of measures of goodness of fit are available, but in our study Young's Stress index was adopted. The results are given in Table 1:

Table 1. Stress Index and map configuration

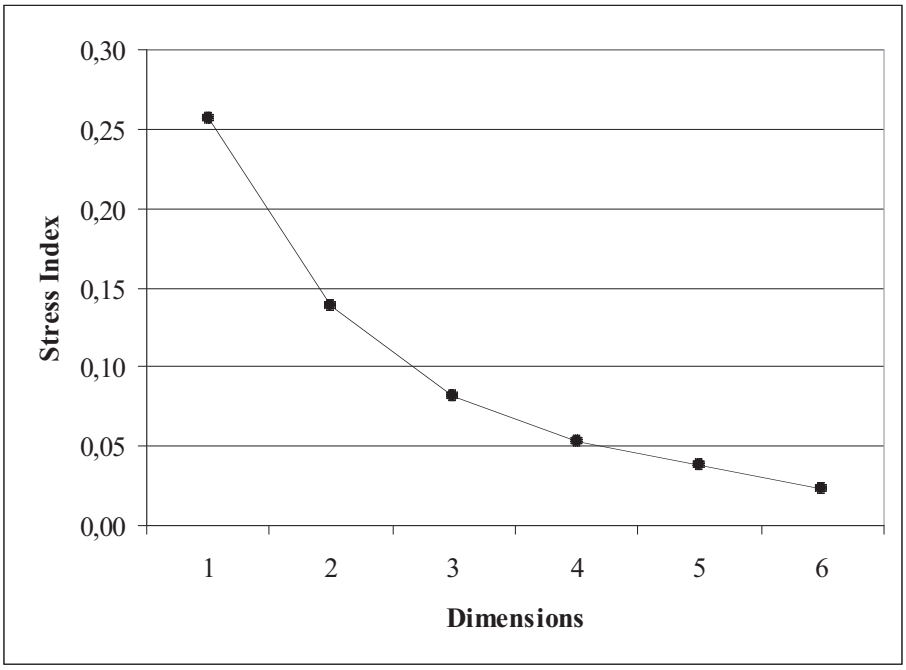
Dimensions	Stress Index
1	0,256
2	0,139
3	0,081
4	0,053
5	0,038
6	0,023

Source: our computation on Eurostat data

It is apparent from the results that a solution in six dimensions gives an almost perfect representation of the data. A visual inspection of the maps suggested that only two dimensions were relevant for our analysis. Basing on the coordinates of the points in the space, we analyzed the relations between dimensions and original variables. This analysis suggested that a map in the first two dimensions may give an appropriate visual representation of the salient features in the data.

The two dimensions model's goodness of fit was assessed via the RSQ (0.915), that indicates the proportion of variability explained by the corresponding dissimilarity distances, and the Stress Index (0,139). As a general rule, results are found to be robust when the size k achieves an Stress Index value lower than 0.15. A two-dimensional model was judged to be acceptable according to the values of the Stress Index, reported in Table 1. Further investigation provided additional basis for choosing the two-dimensional solution: the "elbow" rule suggests to choose the number of dimensions in correspondence to where the diagram yields an "elbow", beyond which the broken line flattens (see Figure 1).

Figure 1. Scree plot



Source: our representation

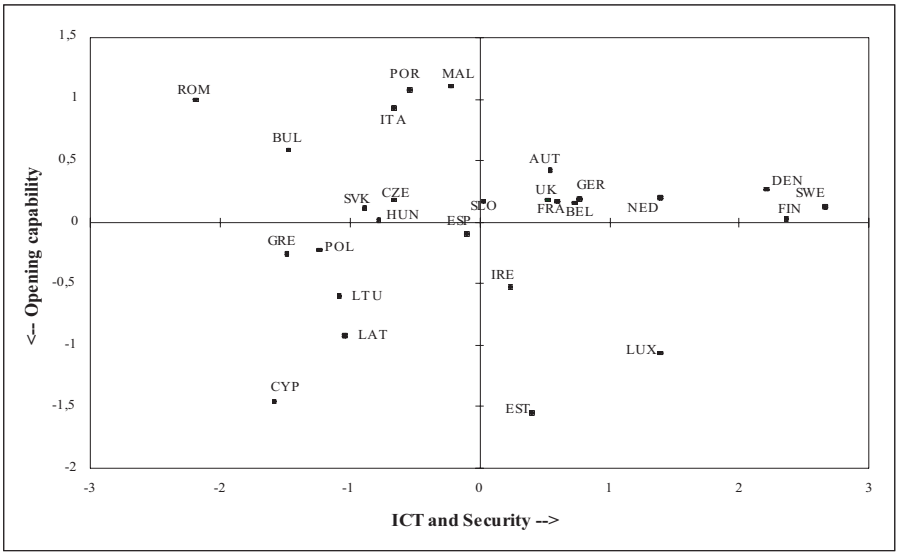
The correlations between dimensions and variables (see Table 2) were also useful for naming the axes. The resulting two-dimensional image is shown in Figure 2. The horizontal axis represents the variables concerning mainly ICT diffusion and national security; the vertical axis is negative related to the opening capability.

Table 2. Correlations between dimensions and variables

Variables	Dimension 1	Dimension 2
Persons with tertiary education attainment	0,54	-0,65
Total intramural R&D expenditure	0,91	0,00
External trade of EU	-0,26	-0,80
Number of airports	0,39	-0,41
Police officers	-0,51	-0,08
Crimes recorded by the police	0,85	0,13
Prison population	-0,41	-0,43
Accidents at work	0,49	0,15
e-government availability (supply side)	0,60	0,25
Broadband penetration rate	0,84	-0,06
Frequency of Internet access	0,91	-0,20
Internet use: interaction with public authorities	0,92	-0,16

Source: our computation

Figure 2. Cluster of countries in a two-dimensional space



Source: our representation

On the right of the chart is the northern cluster, which shows the highest ICT performances and efficiency in security; the group of the main central European countries lies on the centre, with good levels of ICT diffusion and an open capability closer to the average values of the sample; on the left is the cluster of Eastern and Southern European Countries, with their lower level of ICT diffusion and safety efficiency. On the lower area of the chart there are some countries (Baltic Republics, Ireland, Cyprus and Luxembourg) which show a higher opening capability with respect to the others.

4. **Conclusions**

In a globalised context, fuelled by ICTs, collaborative relationship among firms could happen, even if these are located far from each other. These stylized fact generated the so-called "network capital". So by moving from social capital, as a local development driver to network capital, as a global development driver, we provided a preliminary analysis on some European countries, adopting the multidimensional scaling method that allows us to point out where conditions are more appropriate for firms network diffusion. It is worth to underline that this analysis is only a first step in such an investigation and shall not be considered as exhaustive in order to thoroughly understand the reference dynamics, it can simply be useful for further and more detailed investigation.

Table 3. database

	Pupil/Student - teacher ratio and average class size (ISCED 1-3) 2009	Total public expenditure on education as % of GDP, for all levels of education combined, 2008	Persons with tertiary education attainment by age and sex (% of 15-64 years old), 2010	Crimes recorded by the police (per 1000 people), 2009	Prison population (per 1000 people), 2009	Police officers (per 1000 people), 2009	Accidents at work (per 1000 ok people), 2008	E-government availability (supply side), 2010	Broadband penetration rate (%), 2011	Frequency of Internet access: once a week (including every day), 2011	Internet use: interaction with public authorities (last 12 months), 2011	Total intramural R&D expenditure (Euro per inhabitant), 2010	External trade of EU (export/import ratio), 2010	Number of airports (with more than 15,000 passenger movements per year) (per 1000000 of people), 2009
Belgium	10,5	6,5	30,7	97,1	0,9	3,7	8,0	78,8	30,8	78	47	650,1	100,7	0,5
Bulgaria	13,5	4,6	19,4	18,2	1,2	4,1	6,1	70,0	15	46	25	28,4	87,6	0,7
Czech Republic	13,5	4,1	14,5	31,8	1,9	4,2	0,3	73,8	21,5	63	42	222,2	111,6	0,5
Denmark	9,9	7,8	28,1	89,2	0,7	2,0	2,7	94,7	38,7	87	81	1302,4	100,2	1,8
Germany	16,6	4,6	22,6	73,8	0,9	3,0	8,6	94,7	32	77	50	853,4	112,3	0,9 d
Estonia	16,3	5,7	29,7	36,1	2,7	2,4	8,7	93,8	26,7	73	53	173,3	137,2	5,2
Ireland	14,4	5,6	32,8	24,5 a	0,7	3,3	4,9	100,0	23,1	71	44	625,9	131,5	2,5
Greece	8,6 b	4,0 a	21	34,4	1 c	4,5 d	8,4 c	47,5	19,9	47	27	120,1 c	116	3,5
Spain	11,3	4,6	28,1	51,0	1,7	5,1	8,2	95,0	23,6	62	39	317,2	111,5	0,9
France	14,6	5,6	26,3	56,4 e	1,0	3,8	9,5	85,0	32,7	74	57	674,2	95,7	1,0
Italy	10,9	4,6	13	43,8	1,1	4,1 d	2,4	100,0	21,9	51	22	323,8	93,1	0,7
Cyprus	11,8	7,5	32,3	8,9	0,8	6,7	1,9	55,0	24,2	54	29	107,7	147,4	2,5
Latvia	10,6	5,8	22,5	25,0	3,1	3,1	2,9	93,3	19,5	66	41	48,3	138,5	0,9
Lithuania	8	4,9	27	22,8	2,5	3,3	6,7	71,7	21,1	61	30	65,7	135,9	0,9
Luxembourg	10,1	3,2 c	30,3	65,6	1,4	3,2	0,6	72,4	32,5	86	60	1309,8	146,8	2,0
Hungary	11,4	5,1	17,2	39,3	1,5	3,3	0,8	65,8	20,6	66	38	112,4	125,9	0,3
Malta	8,4	6,0	12,7	28,9	1,2	4,5	14,6	100,0	29,2	66	37	93,2	73,9	2,4
Netherlands	15,9	5,5	27,7	74,8	0,9	2,2	6,8	94,7	38,5	90	62	649,7	110,5	0,3
Austria	10,6	5,5	16,4	70,8	1,0	3,2	7,8	100,0	23,8	76	51	942,1	111,6	0,7
Poland	11,4	5,1	19,8	29,6	2,2	2,6	2,1	78,8	16	58	28	68,3	136,1	0,3
Portugal	9,1	4,9	13,8	40,1	1,0	4,6	13,7	100,0	20,5	51	37	258,3	108,8	0,9
Romania	14,1	4,3 c	11,9	13,9	1,2	2,1	0,2	60,0	14	37	7	26,7	92,7	0,4
Slovenia	12,8	5,2	20,2	43,0	0,7	3,9	2,0	95,0	24,1	64	46	364,4	116	1,5
Slovakia	15,2	3,6	15,1	19,4	1,7	2,7	8,6	62,5	16,4	72	48	76,8	112,5	1,1
Finland	13,6	6,1	31,6	81,0	0,6	1,6	13,1	95,0	29	86	68	1302,7	81,6	5,4
Sweden	12,2	6,7	28,3	151,9	0,8	2,1	2,7	100,0	31,7	91	74	1270,8	92,4	3,5
United Kingdom	15,8	5,4	31,5	31,5	1,5	2,7	3,0	98,3	31,4	81	40	484,8	85,2	0,9

Source: Eurostat; a: year 2005; b: year 2006; c: year 2007; d: year 2008; e: metropolitan

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Alina Castagna[*] - Donatella Furia[**]

A SIMPLIFIED GLOBALIZATION INDEX: THE GL-INDEX

Abstract

Measuring globalization is not a simple exercise due to the lack of a common interpretation of its boundaries", especially when the study focuses on the growth process of regions or countries interacting in an open economy. There is a large consensus that it results from the dynamic interaction, driven by economic integration, between different factors which are related to social awareness and to human progress. This paper stems from the need to take a further step towards the construction of a multidimensional framework averaging different elementary dimensions of globalization in order to achieve an overall assessment of integration across countries. By adding new indicators to our previous works, a composite index (GL-index) is implemented to classify forty selected OECD and Non OECD countries. In this connection, we consider a data set of 12 variables selected as proxies of the main dimensions of sustainable globalization in 2010.

JEL Classification: F01, F15, F43.

Keywords: Economic Integration, Education Globalization, Global Outlook.

1. Introduction.

Very few people ignore they are living in the age of globalization, a word evoking a broad concept including dynamic interaction of economic factors, ideas, information and communication technology

[*] Department of Economic - Quantitative and Philosophical - Educational Sciences, University of Chieti-Pescara, Viale Pindaro 42, Pescara 65127, Italy, Tel.: +390854537974; E-mail address: alinacastagna@yahoo.it.

[**] Department of Economic - Quantitative and Philosophical - Educational Sciences, University of Chieti-Pescara, Viale Pindaro 42, Pescara 65127, Italy, Tel.: +390854537974; E-mail address: dfuria@unich.it.

(ICT) and environmental sustainability. Its unclear and complex nature prevents to achieve an overall assessment of its impact and to manage its consequences by means of an objective measurement apparatus.

Taking into account the inevitable arbitrariness of a complex phenomenon measurement apparatus, this paper proposes a Globalization Index (*GL-Index*) as a result of economic integration, technological potential and social awareness, dimensions which are analyzed across selected OECD and NON OECD countries. The main contributions to the literature that this paper proposes are the following. The economic dimension will be described by introducing proxies of prerequisites of globalization, as tariff and non tariffs barriers and investment climate, and next to trade and financial indicators, the index will focus on the increasing economic interdependence of countries driven by the fragmentation of production process.

With respect to our previous works, the introduction of the share of information and communication technology services exports, improves the measurement of the technological potential; the social dimension will be enhanced adding the share of young people highly educated studying abroad to migration and tourism movements, for the reason that this kind of people may better represent the openness to soak up knowledge at a global level.

In order to propose an efficacious and efficient framework able to provide information that may be undertaken and easily understood by most people, it will be proposed a simplex aggregation function that summarizes the information on a synthetic index.

The paper is organized as follows. A critical and theoretical background in section two introduces the model and results that are discussed in the section three. Section four concludes.

2. Critical and theoretical background.

Social awareness, human progress, economic growth, technological diffusion represent the most famous topics in the international debate on globalization but there is no any universally accepted definition of this extraordinary phenomenon.

There a is large consensus that the economic dimension is a crucial

element in the process of integration and it is considered a driver of global advance, especially where governments have played a central role in this process.

The increase of fragmentation in the production process, driven by the optimization of firm production process by locating production steps across different sites according to the rules of comparative advantage, has amplified the economic interdependence between countries in the last decade and thus the global value chain has become a new crucial aspect of globalization (De Backer and Yamano 2007). Over the last few years, there has been a large proliferation of measures concerning economic integration and its implication on growth, focusing on several aspects of this integration, i.e. analysis of prerequisites and outcomes (Brahmbhatt 1998); comparative advantage and its implication for trade (Venables 2003); income convergence among industrialized countries and its relation with free trade (Ben-David, 1993); the role of exports on growth (Lamfalussy 1963; Stern 1967; Beckerman 1962; Kindleberger 1967; Ciocca and Filosa 1972; Kaldor 1966, 1970; Dixon and Thirlwall 1975; Soro 1997; Thirlwall 1978, 1998), the effect of specialization on international trade (Krugman 1987; Stokey 1991; Young 1991); the interaction between the transmission of innovation throughout imports, the dynamics of exports, and the role played by the technological potential in the growth process of an open economy (Rivera-Batiz and Romer 1991; Grossman and Helpman 1991; Barba Navaretti *et. al*. 2004). When dealing with the capacity to innovate of a country, the concept of human capital, which is universally accepted as a crucial determinant of growth in both industrialized and developing countries, comes into view (Marx 1857-1858; Mill 1848; Smith 1776; Say 1821; Senior 1939; Kuznets 1961; Denison 1962; Mincer 1958; Houthakker 1959; Fabricant 1952; Abramovitz 1956). In this respect, Solow[1] (1957) with his innovative work is the source of recent debate on education and human factor as engines of growth. The discussion faces two paths with very different political implications: the attention is focused on one hand on the level of human capital as a primary source of innovations (Nelson and Phelps 1966), on the other hand on its accumulation, as a production input (Lucas 1988; Aghion and Howitt, 1998). The idea that

[1] Solow (1957) introduces technical progress into the traditional production function.

studies on globalization require a careful analysis of numerous factors, which are likely to affect development dynamics and not just economic integration, has gained a large consensus among the international community over time (Castagna and Furia 2010). Most scholars think there are lots of factors, like location (Ravillion 2001) or idiosyncratic characteristics of countries, regarding not just their distance from the technological frontier but also social and institutional milieu (Pritchett 1997, Olson 1996) that need more attention because these issues may influence growth opportunities coming from a globalized world. Many would agree the role of globalization in the development process is not obvious and elements which are the basis of democracy[2] have also to be taken into account to reach the *beneficial potentials* of this process (Stiglitz 2002). However, there are lots of international organizations that use synthetic indexes[3] to monitor global and complex phenomena which represent some different expressions of integration, like human development, global competitiveness, human rights and environment preservation (UNDP 1990-2007, WEF 2004 – 08, La Camera 2005; Wackernagel *et al*. 2004, www.rsf.org).

Recently, there has been a proliferation of studies coping with multidimensional frameworks in the attempt to measure globalization, most of which concerning criticisms and improvements (Andersen 2003, Lockwood 2001, 2004) of a pioneer work about this argument, namely *A.T. Kearney Foreign Policy Magazine Index* (Kearney A.T. 2001a, 2001b, 2006). This index is an assessment of globalization as a result of economic, technological and political integration, where the indicators are weighted with normative significance. The economic domain is considered a driver of globalization, by a priori weights, after a panel normalization of the selected variables. The main criticism moved against the previous index has been overcome by the *Centre for the Study of Globalization and Regionalism (CSGR) Globalization Index* (Lockwood and Redoano 2005) and *KOF Index* (Dreher 2006, *et al.* 2008) and by the

[2] i.e. poor people interests, environment preservation, free trade and human rights.

[3] A multidimensional index is a continuous real valued function which summarize the information about a given distribution. Each distribution is represented by an nxK matrix X=xik ϵ M(n), where M(n) is the set of nxd matrices with non negative elements, d stands for the set of D attributes (d= [1, 2, …D]) and i = [1,2, … n] is the set of n individuals (countries). Let xi represent the row vector of attributes for the i-th individual and xd the column vector of the d-th attribute among countries, the multidimensional index can be expressed by the following function (Lugo 2005): $I_n(X) = M(n) \rightarrow \Re$

G-Index (Radolph 2001), which take into account the economic, social and political dimension, introducing the principal component analysis (PCA) as a statistical definition of the weight system. Trying to reduce the impact of geographical features, the *CSGR Index* introduces a correction factor of economic variables for each country (Caselli 2008, Samimi *et al.* 2012). A control for country size is made also in the *New Globalization Index* (NGI) to distinguish between globalization and regionalism as pointed out by the author (Vujakovic 2010). He introduced some new variables that aim to take a better picture of the phenomena, taking into account the environmental aspect in the political domain and the number of students studying abroad in the social one. Together with the environmental dimension, the *Maastricht Globalization Index (MGI)* (Dreher *et al*. 2010) accounts for variables adjusted for geographical characteristics as proxies for organized violence, global politics, global trade, global finance, movements of people and technology. Concerning the weight, the MGI simply adds the indicators.

All the reviewed contributions aim to provide a framework able to measure a complex phenomenon like globalization that can never be defined on the basis of objective criteria. Therefore, when building a composite index arbitrariness takes place at several steps, in both the descriptive and aggregation phases. The choice of those variables which are representative of the phenomenon, due to the lack of a universally recognized definition of globalization, is a crucial point in the debate between globalization supporters and its discontents, because the effects that globalization generates may be affected by inherent *value judgment* of measurements and each opposing thesis may be sustained by data evidence (Ravillion 2004). During the phase of indicators aggregation across the suitable domains of the phenomenon, researchers may adopt a weight system based on statistical procedures claiming that it is a more objective criterion than assigning a priori weights on the basis of theoretical considerations, overlooking that the choose itself between alternative options is always arbitrary (Caselli 2006).

Aware of the unavoidable arbitrariness of a such measure, the following section presents a new definition of a globalization index in order to more accurately and specifically measure the phenomenon.

3. Globalization Index (GL-Idex).

This section presents the construction of a Globalization Index (*GL-Index*), which captures the following three elementary globalization domains underlining its sustainable features: economic integration, technological potential, social awareness. Each of them has been described by the selected variables showed in tab 1. It stands for a score representing the country position in the international ranking. In defining this function, decisions about the extent to which each indicator is assumed to contribute to the score had been made to create a framework that provide clear and easily interpretable results. In this connection, a sub-index is calculated for each dimension by running the mean of the selected normalized variables, i.e. each indicator has the same weight. The *GL-Index* is obtained by the average value of the scores reached in each dimension, for each unit of analysis. The scores are presented in a scale between 0 and 100, and the higher its value the more globalized is a country.

With reference to our previous works (Castagna *et al.* 2010, Furia *et al.* 2008, Mattoscio *et al.* 2007) some changes have been made. The economic dimension has been split in two components, one representing the *prerequisites* and the other the *outcomes* of globalization and it has been enhanced by three new indicators. First, a composite measure of the absence of tariff and non-tariff barriers *(Trade freedom*[4]*)* that affects imports and exports of goods and services; second, data on the *Investment freedom* which scrutinizes a country's overall investment climate; thirdly, in order to asses the position of a country in the global value chains, an *Intermediate import ratio (Intermediates)* has been introduced, to include the ratio of imported to domestic sourcing of inputs as a proxy of foreign dependency of countries. Income payments and receipts as percentage of GDP has been eliminated from the *outcomes*.

[4] The Trade freedom score is based on the trade-weighted average tariff rate and non-tariff barriers. (…) The weighted average tariff uses weights for each tariff based on the share of imports for each good. (…) An NTB penalty is assigned (…) according to a country's trade policy regime using both qualitative and quantitative information (2008 Index of economic freedom, p. 442).

Tab. 1: Selected Indicators of globalization

Dimension	*Indicators*	*Data*
Economic Integration	*TB-NTB*	*Tariff and non tariff barriers**
	Investment	*Investment freedom**
	Intermidiate	*Intermidiate import ratio***
	Trade	*Trade % of GDP*
	Fdi	*FDI, net outflows plus inflows% of GDP*
Technological potential	*Internet*	*Internet users (per 100 people)*
	H-tech	*High-technology exports as % of manufactured exports*
	R&D	*R&D expenditure as % of GDP*
	Ict	*ICT service exports (% of service exports, BoP)*
Social awareness	*Tourism*	*International tourism (number of departures plus arrivals as % of population)*
	Student	*Outbound mobile students (students from a given country studying abroad)*
	Mig	*International migrant stock as % of population*

*Data source: WDI online- *Heritage Foundation - **OECD*

Secure Internet servers (per 1 million people) are removed from the technological domain because of its high correlation with Internet users. Furthermore, *ICT service export* as percentage of services exports has been added to account for the potential of a country's technological competitiveness. Workers' remittances and compensation of employees, received as percentage of GDP, have been substituted by international migrant stock as percentage of population to analyze the dimension of social awareness.

Trying to better capture the incidence of globalization among individuals, the share of young students highly educated studying abroad has being introduced as a proxy of the population propensity to live in a globalized world.

The analysis includes forty OECD and Non OECD selected countries (cfr. tab. 2) and refers to 2010[5].

With reference to the *GL-Index*, the world's most globalized country is Luxemburg with a score of 72, followed by Ireland and Israel with, respectively, an index of 60 and 54.This result is mainly due to the high scores registered in all the dimensions considered. While the first two are ranked first and second in economic terms, though with a score divide of about 30 points, the technological potential ranking is headed by Israel. From the social awareness point of view, next Austria and Switzerland, the most globalized countries complete the top 5. On the other hand, Luxemburg ranks only 22nd when it comes to technological dimension and Israel ranks 10th in the economic domain.

In the ranking restricted to the European countries, Italy Poland and Greece are the worst performers of the overall index, with disappointing results in all sub-indices while France seems to be the least integrated European country in economic terms. Japan, while ranking 27th in the GL-index, in spite of its position into the top 10 countries with high level of technological potential, ranks at the bottom 10 positions according to the remaining dimensions of globalization.

North American countries rank between the 10th and 20th position in the globalized scenario, while they scores in the top 15 in terms of technological potential and in the lowest 22 according to economic integration. Latin American countries considered in the sample analyzed, show a low globalization score linked to low performances in terms of social awareness and technological potential, despite their medium economic integration that varies from Brazil ranking 36th to Chile at the 16th position.

New Zeland and Australia show a medium level of globalization, ranking respectively, in the 25th and 19th position. Despite a medium-high level of economic integration reached by both countries, the differences between these Pacific countries have to be related to the medium-low scores for the social and technological aspects of integration obtained by Australia and the low migration abroad of New Zealand people.

[5] Missing data are replaced by the most recent available data.

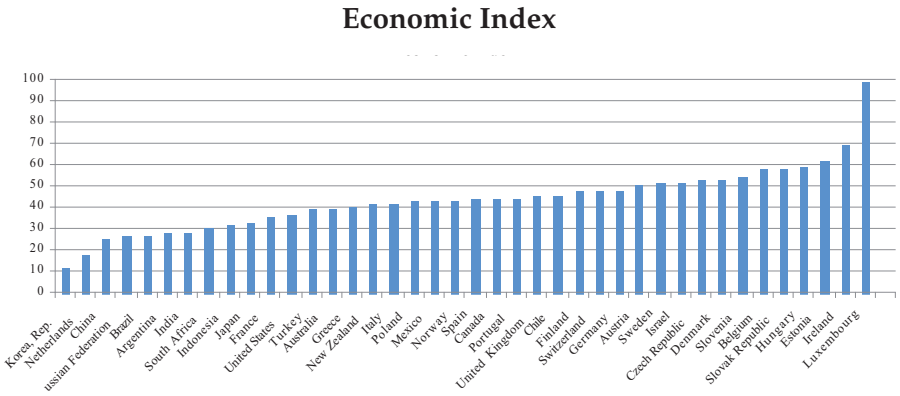
The world's least globalized countries are respectively, Indonesia, Brazil, South Africa, Argentina and India with scores less than 15: this performance is related to low economic integration across counties borders and very few people on the move.

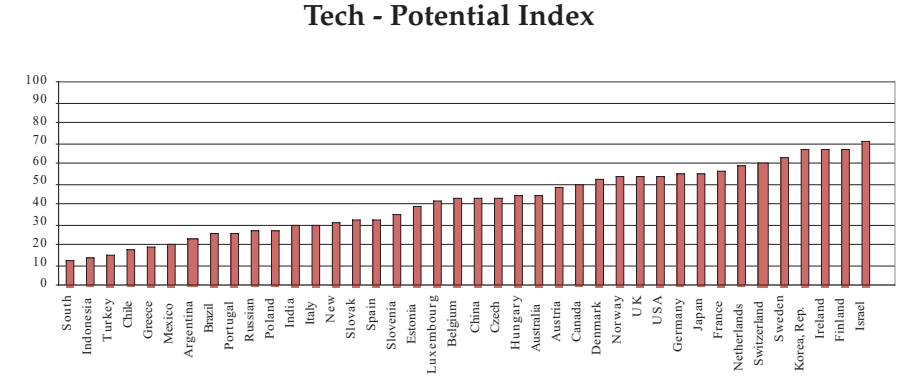
Tab. 2: Countries ranked by GL-Index

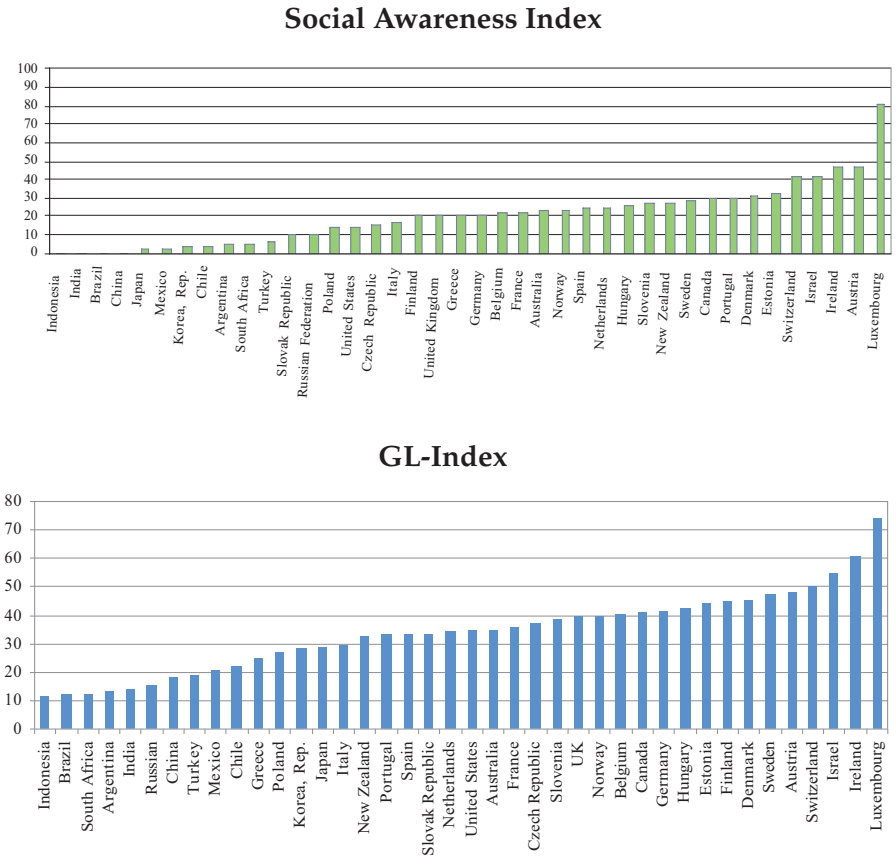
	Country Name	Economic Integration	Tech - Potential	Social Awareness	GL-Index
	Indonesia	20,41	14,22	0,46	11,70
	Brazil	9,68	25,71	0,69	12,03
	South Africa	19,19	12,62	5,38	12,40
	Argentina	11,16	24,04	5,24	13,48
	India	10,33	29,89	0,51	13,58
	Russian Federation	7,93	27,44	11,21	15,53
	China	9,53	43,73	0,89	18,05
	Turkey	34,94	15,23	6,36	18,84
	Mexico	36,39	20,86	3,38	20,21
	Chile	44,10	17,69	4,73	22,17
	Greece	34,28	19,73	21,01	25,01
	Poland	39,38	27,88	14,68	27,31
	Korea, Rep.	12,36	67,18	4,05	27,86
	Japan	26,38	56,22	3,23	28,61
	Italy	39,72	30,60	17,19	29,17
	New Zealand	38,57	31,07	28,27	32,63
	Portugal	42,11	26,06	30,80	32,99
	Spain	41,70	32,89	24,52	33,04
	Slovak Republic	55,53	32,51	11,17	33,07
	Netherlands	18,84	59,35	24,78	34,32
	United States	33,95	54,99	15,25	34,73
	Australia	35,37	45,55	23,37	34,76
	France	28,53	57,35	22,46	36,11
	Czech Republic	50,29	43,79	16,19	36,75
	Slovenia	51,56	36,09	27,47	38,37
	United Kingdom	43,85	53,77	20,81	39,48
	Norway	41,62	53,76	24,01	39,80
	Belgium	55,80	43,52	21,97	40,43
	Canada	42,68	49,92	30,11	40,91
	Germany	46,42	55,60	21,88	41,30
	Hungary	56,31	45,22	25,84	42,46
	Estonia	60,52	39,22	32,70	44,15

	Finland	45,15	68,01	20,76	44,64
	Denmark	51,92	52,82	31,68	45,47
	Sweden	49,33	63,69	29,32	47,45
	Austria	47,68	48,44	47,40	47,84
	Switzerland	47,66	60,66	41,53	49,95
	Israel	50,53	71,39	41,99	54,64
	Ireland	67,37	67,22	46,82	60,47
	Luxembourg	97,74	42,78	82,00	74,17

Source: authors representation







Source: authors representation

4. Concluding remarks

In order to take a further step towards the implementation of a multidimensional framework as an overall assessment of the level of integration across countries, an analysis has been run across forty Selected OECD and non OECD countries with reference to the year 2010. This work is a result of different previous studies that have been helpful in justifying the selection of relevant variables through a critical review of some of the most important studies on this topic, taking into account its effects on growth.

The paper presents some innovation with reference to the author's previous works. Economic integration, which is the historical core of globalization, has been split in two components which stand for drivers and results of the process of globalization, with the introduction of variables representative of trade freedom, investment climate and the country's position in the global value chains, new indicators that complete the picture together with those representing global trade and global finance.

To better assess the incidence of globalization among individuals, in addition to migration and tourism movements, the share of student abroad, as a representation of the modern society openness to undertake global relationships and to be connected with job networks all over the world, has been take into account.

Innovation is represented also by the choice to simplify the calculation procedure by simply averaging the selected variables to achieve dimension scores, and then the mean of the sub-indices gives the *GL-Index* score. On one hand, this simplification is driven by the intrinsic level of arbitrariness in the measure of such a complex phenomenon that cannot be removed by sophistication in the construction of the framework. On the other hand, a simple apparatus could be undertaken and easily understood by most people.

The data application shows results that are in line with most of globalization measurements known by the author. The framework does not introduce a correction factor in order to take into account the impact of geographical features, since the analysis by showing the smallest countries as the most globalized paradoxically seems to delineate an inverse relationship between country size and openness. This is a crucial issue that requires more attention to better assess the phenomenon by implementing a measurement apparatus that may be referred to territorial rather than national units. The relatively limited number of observed countries, due to the lack of data, is obviously a limit.

It is necessary to deepen the analysis of winners and losers of globalization with an assessment that would cover more countries, measure trends and consider changes among different years. This is the next challenge to be met.

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Alessandro Morselli*

THE INTERDEPENDENCY OF THE EUROPEAN ECONOMIES AND THE EFFECTS OF NATIONAL BUDGET POLICIES

Abstract

This paper represents a simplified model which shows the consequences of structural interdependence between European countries. In addition the model used, allows us to evaluate budget policies in a microeconomic and intertemporal perspective.

The analysis of structural interdependency of European countries derives from both their commercial and financial relations that tend to transmit the effects of single productive variations. It takes into consideration the actions of producers and consumers in the countries of the European Monetary Union and the conditions of equilibrium in the financial markets.

The representation of interdependency is placed in the framework of a two-countries model, open to the rest of the world.

The overall analysis is completed from a microeconomic (and intertemporal) approach that is applied to a centralised budget policy such as that in Europe, which is linked to the outside by a system of flexible exchange.

JEL Classication: E61; E62; E63; E66

Keywords: European Monetary Union, Structural Interdependency, Budget Policy, Intertemporal.

* Lecturer of Institutions of Economics and Economic Policy, University of Messina, Italy; Lecturer Kore University of Enna, Italy, E-mail address: alessandro.morselli@unikore.it.
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1. Introduction

In the presence of a price system which is structurally interdependent, the function of any one economy influences that of the others.

In the case of European countries, their interdependency derives from both their commercial and financial relationships which tend to transmit the effects of single productive variations.

In regards representing this interdependency in a context of monetary union, one can use a simplified, aggregate model of two countries open to external trade, linked by a system of flexible exchange.

Furthermore, this model allows us to value the budget policies from the perspective intertemporal and microeconomic.

The analysis of the structural interdependency of European countries is done in the framework of a two-countries model, open to the rest of the world, following on from J.H Levin (Levin 1983) and V. De Bonis' analysis (De Bonis 1994); and the most recent analysis by W. Godley and M. Lavoie (Godley and Lavoie 2007), and J. Mazier and G. Tiou-Tagba Aliti (Mazier and Tiou-Tagba Aliti 2012). This model is used to describe the European Monetary Union (EMU). For simplicity, the region is limited to two countries, France and Italy, which are united by fixed exchange or common currency. The European Monetary Union (EMU), by what it signifies, is relevant on the regional level but it is not important enough to influence the rest of the world (represented by the United States), to which nation it is linked by flexible exchange.

2. The global supply of goods

Every country in the EMU produces a specific product. Its supply of goods is represented by a relationship between its global product and the determinants of the balanced employment rate. It is, therefore, defined by the technical relationship between production levels and the levels employment, for a given capital, in reference to the relative conditions of the labour market.

In any country, the demand for labour depends on the nominal wage rates related to the price of internal products, while the supply of

it is the calculated by dividing the wage rate by consumer prices. This last value is the average in consideration of:

1) The prices of the products of the first country (P), of the second country (P*) and of the rest of the world (PR);
2) The fixed exchange rate which links the first country's currency to that of the second country, if the two countries keep their national currencies. This rate (the 'Euro' in the case of Europe) is considered unitary;
3) The exchange rate (E) between the dollar and the Euro (or the specific European currencies).

In every country a price increase of the national products determines a demand for surplus labour which provokes a rise in the nominal wage rate. This is followed by an increase in the supply of labour and a decline in the demand, until a new equilibrium is obtained from the nominal wage rate and a higher employment rate.

A decrease in prices of other EMU countries' products or the prices of those products from outside the EMU (or indeed a fall in the exchange rate E), increases the purchase power of wage earners and brings a surplus supply of labour. All this determines a decrease in the nominal wage rate and a rise in the demand for labour until once again a new balance is achieved at a higher level of employment.

Respective global supplies of the first country (Y) and of the second country (Y*), can be expressed in the following way:

$$Y = Y (P, P^*, PR, E);$$

$$Y^* = Y^* (P, P^*, PR, E) \qquad (1)$$

It is assumed, for simplicity, that the relationships between the supply side and national price variations, of foreign prices and of the exchange rate, are the same in country A and in country B.

3. The global demand for goods

In every European country, the demand for national products is formed by:

1. Demand by private operators measured by the difference between their demand for national and foreign goods (C) and (C*) and their importation;
2. Public demand (G) or (G*) that is external and applies to national products;
3. Demand by non-residents which corresponds with exportation.

The demand in the products of country A and of country B are defined respectively in the following way:

$$Y^d = C\ (Y, T, r) + G + B_c\ (Y, Y^*, Y^R, EP_R\ /P, P^*/\ P) \qquad (2)$$

$$Y^{d^*} = C^*\ (Y^*, T^*, r^*) + G^* + B_c^*\ (Y, Y^*, Y^R, EP_R\ /P^*, P^*/\ P^*) \qquad (3)$$

In these relationships, demands (C) and (C*) depend on global revenues (Y) and (Y*), on forfeited taxes (T) and (T*), and on interest rates (r) and (r*). As far as the sale of the commercial balance (Bc) and (Bc*) are concerned, these are revenue functions of the country considered by the revenues of the second country and by the rest of the world (Y^R), and by the relationship between foreign prices in national currency and the national price. For simplicity, the demand for national goods abroad reacts in the same way to variations in revenue and in the two countries' prices.

4. Equilibriums in the Financial Markets

It is hypothesised that the financial capital mobility and the sustainability of activity is perfect at global level and that the EMU does not have sufficient importance to influence interest rates in the rest of the world (rR). In this way the interest tax of country A and of country B are the same as those of the obligations in the rest of the world. This can be expressed by the following expression, overlooking prevision in the variations of exchange rates:

$$r = r^* = Rr \qquad (4)$$

In the case of the two systems, A and B having two different

currencies, the supply of MA and of MB, defined as (M) and M*), has internal credits (F) and (F*) a compensation and an exchange reserve (R) and (R*). The demand for these currencies in real terms (L) and (L*) depends on the global revenue (Y) and (Y*) and on interest rates (r) and (r*).

Hence, monetary equilibrium in the two countries is defined in the following way:

$$M = F + R = PL\,(Y, r);$$

$$M^* = F^* + (R^* - R) = P^*L^*\,(Y^*, r^*) \qquad (5)$$

In relationship (5), the sum of the currency reserve of countries A and B, (R*), is external due to the flexibility in exchange rates between the external currencies of the Union; this allows us to define the reserves of country B by the difference (R*- R) (For a description of the relationship between two economies linked by a system of flexible exchange see: Rankin 1990).

If the European Central Bank (ECB) manages the national currency by linking it to a fixed exchange rate, it ensures the two countries' monetary equilibriums, furnishing them with the necessary currency for a given European exchange rate. In this case, monetary equilibrium is defined by the following relationship, the term on the right indicating the distribution in the Union's supply of currency within the two countries A and B:

$$M_\mu = M + M^* = PL\,(Y, r) + (P^*L^*\,(Y^*, r^*) \qquad (5')$$

In the contrary case in which the two countries have adopted the euro, there is only a single supply of Union currency (M_μ) and a nominal demand for euro (L_μ), that depends on the European interest rate (r_μ) defined on the basis of (4), of the global revenue (Y_μ); and of the average European price (P_μ). In this case, the condition of European monetary equilibrium is expressed in the following way, with an external currency supply:

$$M_\mu = P_\mu\, L_\mu\,(Y_\mu, r_\mu) \qquad (6)$$

Now it is possible to analyse the budget policies of an EMU member and their effects in the ambit of the EMU.

5. The effects of budget policies with severe prices, common currency and fixed exchange

The analysis of the short term is placed in the framework of a model that describes the EMU through:

1. Equations of global product determination, defined by relationships (2) and (3) that include the equivalencies $Y=Y^d$ and $Y^*=Y^d$
2. Condition (6) of EMU monetary equilibrium that is characterised by currency and unique interest rates.

A rise in public expenditure in country A encourages national production. The rise in revenue brings an increase in country A's demand, as much for goods produced in country A as for those produced in country B with effects in production therefore for both.

The increase in production in the European context (A and B) influences a rise in the importation of goods e.g. from the United States, which would lead to depreciation of the euro in relation to the dollar. However, the borrowing used to finance country's A expansive policy effectuates a temporary rise in European interest rates, which brings a flow of capital and an appreciation of the Euro that overcompensates for the depreciation generated by the commercial deficit due to the perfect mobility of capital. The drop in the European exchange rate reduces the European countries' competitiveness. This instigates a negative effect on European demand for goods that lessens the positive influence of the initial expansive policy on country A's production, which overcompensates for the positive effects of the higher purchasing rate in country A on the production of country B.

The rise in public expenditure (G) or (G*), financed by borrowing in one EMU country, therefore brings about:

1. A growth in national production ($\partial Y/\partial G$, $\partial Y^*/\partial G^*>0$);
2. A negative external flooding effect on the global product of country B ($\partial Y^*/\partial G$, $\partial Y/\partial G^*<0$). This effect compensates for the positive influence of expansive policy on the national product ($\partial Yt /\partial G$), which allows monetary equilibrium (6) to be achieved

at an unaltered interest rate;
3. An appreciation of the Euro in relation to the foreign currencies to the EMU ($\partial E/\partial G$, $\partial E/\partial G^*<0$);
4. A deterioration of the commercial sale of the EMU as a consequence of the decline in the euro exchange rate.

6. Effects with an intra-European fixed exchange rate

We will now go on to consider the hypothesis in which two European countries (A and B) have monetary autonomy and are tied to each other by fixed exchange rates (See the model by Bryson 1994). Analysis of the effects of budget expansion in country A, is positioned in a model formed by two equations of global product determination (2) and (3) and by the conditions of monetary equilibrium determined by (5) which include (4).

The effects of an increase in public spending in country A on the different European countries (A and B) can be represented by imagining two graphs in IS-LM, in which the lines IS (A) and IS* (B) represent relationships (2) and (3) that include $Y = Y^d$ e $Y^* = Y^{d^*}$ and the lines LM and LM* (B) correspond with the conditions defined by (5).

The increase in public spending of country A, that translates into a shift of IS (A) towards the right, individuates national production. The rise in importation into country A that follows, this also encourages production in country B; this then has a positive effect on country B that, in its turn, exercises an ultimate positive effect on country A's activity. This development in commercial trade between the two EMU countries causes a deterioration in commercial sale of country A towards country B, that brings a depreciation in the currency of A in relation to the currency of B.

This effect is more compensatory to the appreciation of country A's currency, which derives from the influx of capital that brings a rise in country A's interest rate, caused by the process of public borrowing. Direct interventions to maintain a stable exchange rate between the two currencies of A and B bring a rise in the reserve and in the monetary mass of A and a reduction in the two in B. Such measures translate into a shift to the right of LM (A) and towards the left of LM* (B).

As for the measure in which country A's budget expansion causes a transitory rise in the EMU's interest rate, this determines, moreover, a flow of external capital to the EMU and an appreciation of the European currencies. The following is a negative effect of the demand for goods of countries A and B; this lessens the initial positive initial effect on Y (A) and overcompensates for that exercised on Y*(B).

An increase in public spending G and G*, financed by borrowing in one of the EMU countries therefore brings about:

1. A growth in the national product of country A and a drop in that of B;
2. An appreciation of European currency;
3. A rise in the reserve in country A ($\partial R/\partial G$, $\partial R^*/\partial G^*>0$) and fall in the reserve in country B ($\partial R^*/\partial G$, $\partial R/\partial G^*<0$).

The importance of these effects will be lessened in the case in which the growth in public expenditure should be financed through tax withdrawal, due to the suppressive effect of this on demand.

Similar results can be obtained in the framework of a model built around relationships (2), (3), (4) and (5') for European countries that have given up their monetary autonomies. However, in this case, monetary equilibrium is ensured by the ECB and not by the variation of the reserves.

7. Effects in the presence of flexible prices

Let us now go on and analyse the effects of a country's budget policy on price levels and on EMU activities and the diffusion of these effects through the different component countries (for a discussion see Frankel and Razin 1987).

In the case of process flexibility, the EMU can be described by the following relationships that determine the average price and the European global product, for example the European exchange rate of the euro:

1. A global supply in goods that is the result of aggregation of the relationships defined by (1);
2. A demand for goods that comes from the aggregation of relationships (2) and (3);

3. The condition of European monetary equilibrium (2).

The surplus demand for goods induced by an increase in public expenditure in country A determines a growth in the level of European prices, due to the growth in the supply of goods in the EMU. A new equilibrium is reached for the higher production, higher prices and weaker net exportation.

The loan used to finance public spending brings about a transitory increase in European interest rates; this brings an appreciation of the euro. A growth in supply of goods in the EMU and a reduction in its exportation follow on.

Considering these effects together, an expansion of the budget effectuates:

1. A fall in the level of European prices, as the rise in supply of goods is superior to the net growth in demand;
2. A rise in the European global product;
3. An appreciation of the euro in relation to the internal currencies.

The stimulant effect on European production of budget expansive policy can be discussed in the case in which the goods of all three together (countries A, B and the rest of the world) can be considered perfectly sustained; this includes achieving the condition of *purchasing power parity.* In this case, an expansion of the budget does not influence employment but produces instead a rise in inflation, as in the preceding single-country model.

8. Effects on the different components of the EMU

To complete the picture of analysis in the previous paragraph requires us to add two relationships of which one corresponds with the difference between the conditions of equilibrium of markets and products. These relationships allow us to specify the following effects exercised by expansion in country A on the two components A and B:

(1) Such expansion brings a growth in the global product in A, which is lessened by the negative influence of decline in exportation to the rest of the world;
(2) It can determine a rise or fall of the global product in B. In effect, this induces an appreciation of the Euro in relation to currencies

outside the EMU, it produces a growth in the global supply of goods and a reduction in demand. However the surplus supply that follows on can be partially absorbed or more than compensated for by the rise in demand on the part of A for goods produced in B;

(3) It exercises an indeterminate effect on the country's prices, as it can bring about a supply or a surplus demand for goods, relieving its negative effect on net exportation;

(4) It reduces the prices in B because it causes a drop in E that induces a surplus supply of goods, even if demand is stimulated in B this reduction is more significant than that which country A will eventually suffer.

In the case in which two countries keep monetary autonomy within the context of a system of fixed exchange, the expansion of the budget of country B determines, as in the case of fixed prices, a rise in the monetary mass of country A and a fall of monetary mass in country B. These effects of redistribution are nonetheless lessened by the influence of price variations on the real values of the respective monetary masses (For an analysis on integration of national budget policies and of common currency policies see: Beetsma and Debrun 2004; Correia, Nicolini and Teles 2003).

9. The EMU and its budget policies in relation to the rest of the world

In the case of interdependency within two EMU countries and between these two and other economies together, the effects should be well supported by models which include at least three countries, which highlight moreover the effects of the EMU.

As far as the three-country model is concerned it tends to describe structural interdependency, it should highlight the interdependency:

(1) of A and B that form a union both with distinct currencies and a single currency;

(2) EMU (C) and of the third country (R), that represents the rest of the world.

It is highlighted that such a model links as an extension of a model of two countries and at fixed prices. This is formed by:

a) The equations of determination of the global products of A and of B defined as originating from relationships (2) and (3), that include the equations: $Y = Y^d$ e $Y^* = Y^{d*}$;
b) The following relationship that determines the product of the rest of the world YR, and which variables are characterised by an index (R), defined on the characteristics of the rest of the world's economy:

$$Y_R = C_R (Y_R, T_R, r_R) + G_R + B_{cR} (Y, Y^*, Y_R, P /EP_R, P^*/ EP_R) \qquad (7)$$

c) The condition of parity in interest rates (4), that defined the perfect mobility of capital and the perfect substitution of the financial activities;
d) The condition of monetary equilibrium of the two European countries (5) or of the monetary union (6);
e) The following equality between supply MR and demand LR of the rest of the world's currency:

$$M_R = P_R L_R = P_R L_R (Y_R , r_R) \qquad (8)$$

It is assumed for simplicity that the agents of the three countries react in a symmetric way to the modifications of the external variables.

In the context of this model, we will analyse now the effects of a European country's budget policies.

The rise in public expenditure in A grows the global product of the country, also stimulating demand by the part of A for goods produced by B. An increase in production in B is effectuated in this way. This results in an increase in European importation, which stimulates production in the third country. Furthermore the financing of public spending through borrowing increases the European interest rate, which attracts capital and depreciates the currency in the third country in relation to the Euro or the individual European currencies. This depreciation exercises a positive effect on the third country's activity and a negative effect on A and B's activities.

The rules of international financial arbitrage re-establish the equality between the European country interest rates and that of the third

country at a higher level to the initial rates. This rise produces negative effects on the production of all three (A, B, R).

Hence, the expansion of A's budget brings a rise in European interest rates (r_U) and those of the rest of the world (r_R) and a growth in the global production within the union (Y_U) and the rest of the world (Y_R).

In the context of the monetary union, the rise in production in country A, stimulated by the processes of public spending and by importation from the rest of the world, is slowed down by the appreciation of the Euro and by the growth in interest rates.

These two factors also reduce the product in country B, this effect is lessened by the positive role of purchasing by the part of A and by the rest of the world, which is an increased activity.

If the politics of A is placed within a union with fixed exchange, it determines a rise in the reserve of A, to the detriment of that in B, because the borrowing which finances it produces a transitory shift in the interest rate in A in relation to that of B.

10. The intertemporal scenario

The analysis can also be extended to a microeconomic and intertemporal perspective. This finds reference in the model of N. Rankin (Rankin 1990; see also Cuddington and Vinals 1986), which illustrates the interrelations between two economies linked by regimes of flexible exchange.

Let us hypothesise that both of those taken into consideration in the model are A (the EMU) and B (the rest of the world). The EMU manages the single currency and also exercises a stabilising function on the level of activity, thanks to its own budget policy. The model specifies intemporal behaviours of the representative agents A and B that are addressed in a bi-periodic interval and defines (on these bases) the conditions of equilibrium in the markets. A and B each incorporate three categories of operators, which are able to achieve perfect previsions: Businesses, families and the State.

In period (t), that represents a brief period, production is determined by demand for goods at given fixed prices and unemployment is at

an insufficient level to the demand for goods. In period $t = 2$, that corresponds to the long period, the perfect flexibility of prices and of wages ensures the equilibrium in the market of goods and of labour for supply of work which is externally determined. As far as agents like families are concerned, together with the EMU and together with B (the rest of the world), they maximise respectively the functions of intemporal utility:

$$U = U (C_t, H_t, M_t/P2)$$

$$U^* = U^* (C_t^*, H_t^*, M_t^*/P2^*)$$

$$\text{with } t = 1, 2 \qquad (9)$$

In A and B, the utility of the *family-type* U and U* grows with the quantity of national goods C or C* and foreign goods H_t o H_t^*, consumed in $t = 1, 2$ and with monetary resources in real defined terms, on the basis of prices of the period $t = 2$.

Representing every relationship specified in expression (9) under the particular form of a combination of Cobb-Douglas function, we can include the influence exercised by families. This allows us to complete the analysis effectuated in the framework of models that presuppose the perfect substitution of products or the absence of links between specialist goods produced in A or in B.

Every *family-type* is assumed to have an intemporal constraint, on the basis of which its consumption of national and imported goods and desired monetary income cannot exceed the resources V and V*, placed in the two periods. These resources are freed from the monetary income held back at the start of $t = 1$, that is defined as (M_0/P_1) and (M_0^*/P_1^*) and from the sum of the net revenues actually imposed on the basis of factor α or α^*. Hence:

$$Y_1 - T_1 + a(Y_2 - T_2) \text{ or } Y_1^* - T_1^* + a(Y_2^* - T_2^*)$$

11. The State and its budget constraints

For each, the State can finance its spending G_1 or G_1^* through taxation T_1 or T_1^* and with loans in the first period, and only with taxation T_2 and T_2^* in the second period. Its decisions are assumed to have intertemporal constraints, on the basis of which the actual values of public expenditure have to be equal to the taxation values. Taking into account the value of the taxation in the definition of constraints, the families' resources V and V* can be defined in the following manner:

$$V = Y_1 - G_1 + a(Y_2 - G_2) + M_0/P_1 \qquad (10)$$

$$V^* = Y_1^* - G_1^* + a^* (Y_2^* - G_2^*) + M_0^*/P_1^* \qquad (11)$$

The content of these constraints shows the presence of a *ricardian equivalence*, on the basis of which a variation in public expenditure exercises the same effects that are financed by taxation as well as by borrowing.

12. Market equilibriums

The model defines, for each one of the groups of countries, the conditions of equality between demand and supply of goods for each period and the conditions of equilibrium on the financial markets.

As far as the products market is concerned in the period $t = 1$, the global product is determined in each of them by the demand by private residents C_1 e C_1^*, by the State G_1 e G_1^*, and by non residents H_1^*or H_1 according to the following relationships:

$$Y_1 = C_1 (V, P_2/P_1, E_{R1}) + G_1 + E_{R1}, H_1^* (V^*, P_2^*/P_1^*, E_{R1}) \qquad (12)$$

$$Y_1^* = C_1^* (V^*, P_2^*/P_1^*, E_{R1}) + G_1^* + H_1^*/ E_{R1} (V, P_2/P_1, E_{R1}) \quad (13)$$

At the time $t = 2$ the perfect flexibility of prices and wages assures the equality between the global demand and supply of goods, the demand of each country and the presence of the natural tax of unemployment:

$$Y_2 = C_2 (V, P_2/P_1, E_{R2}) + G_2 + E_{R2}, H_2 * (V^*, P_2^*/P_1^*, E_{R2}) \quad (14)$$

$$Y_2^* = C_2^* (V^*, P_2^*/P_1^*, E_{R2}) + G_2^* + H_2 */E_{R2} (V, P_2/P_1, E_{R2}) \quad (15)$$

Private demand for goods that determines the relationship from (12) to (15) are defined on the bases of families' optimisation programmes , that define functions of utility, taking into account the principle of substitution between goods and the budget constraints.

These functions depend on the resources available, on the effects of intertemporal substitution determined by the variations of (P_2/P_1), or (P_2^*/P_1^*) and of the real exchange rate $E_{Rt} = E_t \; P_t^*/P_t$. The economic activity of the two countries influences external equilibrium. However every equilibrium at the time *t = 1* must be compensated by an opposite effect at the time *t = 2*.

As far as the markets are concerned with non real activities, in each country monetary equilibrium is achieved through a supply of surplus currency and with a demand for currency that depends on the resources (V) and (V*) and on the nominal interest rate (r) or (r*). Dividing the condition of equilibrium of a period by that of the second period, one obtains a relationship that acts as a nominal interest rate of each country. This depends exclusively on the relationship between monetary masses at the time *t = 1, 2*. In the financial markets, the perfect mobility of capital ensures the achievement of equality in interest rates.

This condition guaranteed by a system of international arbitrage is defined by matching the real interest rate of the EMU $[r-(P_2 - P_1)/P_1]$ and the current taxation in the rest of the world $[r^*-(P_2^*- P_1^*)/P_1^*]$, corrected through the variation perfectly anticipated by the real exchange rate $(E_{R2} - E_{R1})/E_{R1}$:

$$[r-(P_2 - P_1)/P_1] = [r^*-(P_2^*- P_1^*)/P_1^*] + (E_{R2} - E_{R2})/E_{R1}: \quad (16)$$

The model outlined determines the values of EMU products and the rest of the world (considered unitarily) at the time *t = 1*, that of their prices at the time *t = 2*, exchange rates and commercial sales in the two periods.

13. The Budget policy

The analysis is concentrated on the effects of a short-term increase of the EMU' current public expenditure and on the anticipated and permanent expansion of the budget.

As far as the effects of a transitory expansion are concerned, an increase contingent on public expenditure in the ambit of the EMU at the time $t = 1$ ($\partial G_1 > 0$, $\partial G_2 = 0$) exercises the same effects whatever the non –monetary nature of its finance, following the presence of *ricardian equivalence* (Ricardo 1951).

This stimulates production in the EMU at the time $t = 1$, on the basis of (12), from the moment that brings an increase in resources (V). However the latter is completely compensated for by conforming to relationship (10), by the decrease derived from the immediate worsening of taxation which is applied to finance the expenditure or in any case by their future destined increase to resist the service on the debt contracted at the time $t = 1$. From the moment that the budget policy leaves the value of family resources and the relative value of the monetary mass of the two periods unaltered, it does not influence the importation of goods or the EMU nominal interest rate. The exchange rate of the time therefore remains constant $t = 1$.

Furthermore, from the moment that there is no action in response to the private demand for national and imported products in the time $t = 2$, no effect is produced on the prices and on the components of foreign sale. This ensures exchange rate stability.

The transitory rise in public expenditure in the EMU at the time $t = 1$, therefore only influences the European global product inducing a multiplicator unitary effect ($\partial Y_1 / \partial G_1 = 1$). Its efficiency is therefore independent from the products' degree of substitution. If the increase in public expenditure decided at the time $t = 1$ is also maintained in time $t = 2$ (∂G_1, ($\partial G_2 > 0$), this exercises effects which correspond to the combination of relative decisions to the transitory rise and to the anticipated increase in public expenditure.

The process of anticipation itself therefore should also be analysed in its effects: It is supposed that families in the ambit of the EMU perfectly anticipate at time $t = 1$ an expansion of public expenditure in

the following period ($\partial G_1 = 0$, ($\partial G_2 > 0$). From the moment that families understand that such an expansion can only be financed through added taxation, they can foresee a reduction of their available resources; this determines a decrease in their demand for products from Europe or outside of it, as much as in time $t = 1$ as at time $t = 2$.

Considering these reductions in private demand and the rise in EMU public expenditure in the period $t = 2$, families of the EMU foresee, moreover, an increase in European prices P_2 and a reduction in prices P^*_2 (non-European). This means a fall in the real exchange rate at the time $t = 2$, for a given nominal exchange rate. These price variations at time $t = 2$ cause effects of intemporal substitution in as much as the prices at the time of $t = 1$ remain fixed.

In effect, a rise of P_2/P_1, brings about, on the basis of the relationship from (12) to (15), a rise in the European demand for European and non-European products at the time $t = 1$ and a reduction in the same demand at the time $t = 2$. The same goes for the reduction of prices P_2^* in relation to P_1, this produces a reduction in demand from outside of Europe for products at the time $t = 1$, and a growth at the time $t = 2$. To these effects of intertemporal substitution can be added the effects of temporal substitution. In fact, at the time $t = 1$, the anticipated rise of European prices P_2 and the anticipated fall of those non-european P_2^* determine on the basis of relationship (16) a reduction in the real interest rate in Europe in relation to non-European tax. This induces an influx of capital and a rise in both the nominal and real exchange rates. Therefore the demand for European goods increases and the demand for non-European goods diminishes at the time $t = 1$. Furthermore, from the moment that European exportations increase and importations reduce, the commercial sale of the EMU improves. At the time $t = 2$, the predicted real exchange rate diminishes for a nominal rate given, in the measure in which the anticipated prices outside of Europe reduce, until European prices rise. Therefore the demand from outside Europe grows to the detriment of that in Europe.

In summary, a budget expansion which is anticipated in Europe exercises the following effects:

1. A rise in the nominal and real exchange rates at time $t = 1$;
2. An anticipated fall in the real exchange rate at time $t = 2$;

3. A rise in European activity in $t = 1$, that derives from the effects of temporal and intertemporal substitution lessened by a negative effect on assets induced by the fall of (V);
4. A fall in the non-European global product in $t = 1$ owing to the effects of substitution;
5. An improvement in European commercial sale at $t = 1$.

Putting together these results with those following in the case of a transitory budget expansion, one can define the effects of a permanent rise in European public expenditure ($\partial G_1, \partial G_2 > 0$). The latter exercises more significant effects on the European global product in $t = 1$ and the same effects on the other variables produced by an anticipated budget expansion.

Its externalities on the non-European product are negative, while they would be positive in a two-country model such as that of Mundell (Mundell 1963) and Fleming (Fleming 1962; see also the model by Muet 1998).

14. Conclusion

The aggregate models here shown, extending to two or three countries, allow us to illustrate the consequences of growing structural interdependency between European countries in a simplified way. These consequences can be summarised in the following way: it reduces the multiplicator effects of an expansion of the national budget, something which can be verified in results obtained in the preceding analyses compared to those arising from the analyses conducted in the first part; this implies that a rise in public expenditure in one country produces positive externality on the activity of the others, in turn increasing demand for their goods and produces negative externality due to a rise in international interest rates and an appreciation in the exchange rate between European currencies and those from outside the union.

The overall analysis is completed from a microeconomic approach that is applied to a centralised budget policy such as that in Europe, which is linked to the outside by a system of flexible exchange. This approach allows us to include the case of *ricardian equivalency* and

to show the repercussions they can have on the degree of product substitution in both economies, in both positive and negative values, the effects of flooding on the budget policies of one country towards another. It is precisely these effects of flooding, which are at the base of strategic choices made between interdependent countries.

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In the latest centuries, generally speaking, history records the alternation of some important seasons which lend themselves to represent economic models, which are the bases of modern economic thought.

First of all, there is the age of *colonial economy* centered on the role of imperial states, together with the birth of monopolistic companies, in the management of trades with dominion areas.

Then, the age of *international economy* was lived, culminating in the second post war trade relation system. It was mainly founded on the functions of the national states and their authorities to support both national espansionary fiscal policy and exchange clearings, in their trade ratios with the rest of the world.

At last, in the latest years, *interglobal economy* took vehemently the lead through the modern electronic infrastructures of telematic and telecommunications.

As the former models, the *interglobal economy* too does not automatically assure either stable equilibrium or the overcoming of traditional crises.

It gives benefits and disadvantages too.

From the normative and positive points of view, one of the disadvantages which most drew the attention of researchers is the weakening and disappearance of national and subnational economic and monetary policy instruments.

Instead one of the benefits which most attracted interest might be located on the nature itself of the technological revolution in progress, foreboding new opportunities in the integration process of local economic systems, which might qualify themselves as network growth links (or growth poles?).

The Review has the aim to represent and to inquire the normative and positive profiles of the foundamentals which might characterize the thin and difficult frontier between globalization and economic localism.

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