Fiscal Policy, Eurobonds and Economic Recovery: Some Heterodox Policy Recipes against Financial Instability and Sovereign Debt Crisis.

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Fiscal Policy, Eurobonds and Economic Recovery: Some Heterodox Policy Recipes against Financial Instability and Sovereign Debt Crisis.

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Abstract

In this paper, we propose a simple post-Keynesian model on the linkages between the financial and real side of an economy. We show how, according to the Minskyan instability hypothesis, financial variables, credit availability and asset prices in particular, may feedback each other and affect economic activity, possibly giving rise to intrinsically unstable economic processes. Through these destabilizing mechanisms, we also explain why governments intervention in the aftermath of the 2007 financial meltdown has been largely useless to restore financial tranquility and economic growth, but transformed a private debt crisis into a sovereign debt one. The paper ends up by looking at the long-run and to the interaction between long-term growth potential and public debt sustainability. We explicitly consider the Euro-zone economic context and the difficulties several EU members currently face to simultaneously support economic recovery and consolidate fiscal imbalances. We stress that: (i) financial turbulences may trigger permanent reductions in long-term growth potential and unsustainable public debt dynamics; (ii) strong institutional discontinuity such as Eurobond issuances may prove to be the only way to restore growth and ensure long-run public debt sustainability.

Keywords: post-Keynesian models, financial instability, debt sustainability, Eurobonds.
JEL code: E12, E44, H63

1. Introduction

From mid 2007 on, the sub-prime crisis has brought back to the center of common people and government thoughts economic problems such as deep and prolonged economic recession, widespread and rising unemployment, increasing life uncertainties. It was from 1929 Great Depression that these problems were not perceived as so urgent and immediate as they are today.

Since then, governments and monetary institutions of almost all developed and developing countries have been engaged in financial system rescue programs aiming to re-establish the normal functioning of financial markets and of the overall economy. In the meanwhile, the initial financial crisis has turned into a confidence crisis on the sustainability of public debt stocks. Accordingly, even if economic recovery still lacks or decelerates in most economies, the initial support to anti-cyclical measures has been replaced by the insistent call for restrictive fiscal policies and the rapid obtainment of public account equilibrium. In a pretty

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short time span, the alleged return to Keynesian policies have been forgotten; very standard IMF-type adjustment programs have come back to dominate economic theory and policy practice. This is particularly true in Europe, where the so-called PIIGS countries, i.e. Portugal, Ireland, Italy, Greece and Spain, find themselves stuck in a hurry to implement tight fiscal corrections to assure financial markets about public finance solidity.

In this paper, we aim at analyzing some of the economic forces leading to the present gloomy worldwide economic context. First of all, we want to enlighten some perhaps relevant mechanisms connecting the financial side to the real side of an economy, possibly showing how financial variables, let's say available credit and financial asset prices, may heavily influence economic performances. Secondly, we try to provide a formal description of the Minskian financial instability hypothesis, that is to say to analytically describe destabilizing processes that seem to naturally characterize nowadays financial systems. We emphasize the hard job economic policy institutions have to undertake to stabilize financial markets and show why public intervention in the aftermath of the 2007 sub-prime crisis have proved largely useless to re-establish financial order and eventually resulted in sovereign debt crises. Finally, we look at the long run and try to see how long-run growth potential and public debt evolution interact each other. In this sense, we explicitly take into account the European case insofar as we try to evaluate the usefulness of new Eurobond liabilities to support EU member countries efforts against financial instability and in favor of economic recovery.

We address the above topics by developing a simple post-Keynesian model. In this regard, we stress clearly that our task is not to elaborate a complex stock-flow-consistent (SFC) analytical framework. In a sense, our goal is much more modest and narrower. It ends up in the formal description of a strict bunch of mechanisms at the base of the recent financial instability and of the ensuing economic downturn. Nevertheless, even though our work is based on a differently methodology with respect to SFC models, it shares the same theoretical background. The present work heavily draws inspiration from some previous post-Keynesian contributions. Two articles from Lavoie (2006) and Fontana and Setterfield (2009), in particular, are the starting points on which to build up the present model.

According to Lavoie (2006) and, more generally, to the post-Keynesian perspective on monetary phenomena (Bertocco, 2006 and 2009), we embrace the endogenous money theory. We model Central Bank behavior as setting discount rate on the base of a well-known Taylor rule (Taylor, 1993), while base money creation ultimately emerges from effective credit demand (Bertocco, 2009). With respect to the Lavoie 2006 model, however, we explicitly consider the role of financial operators, commercial banks in particular, and formally represent an effective credit demand function. Whilst these last points are already present in Fontana and Setterfield (2009), we try to go a step further by endogenizing the operational behavior of financial institutions and not to represent them as constant parametric aspects of the model. On the contrary, we describe their endogenous adjustments as potential core sources of financial instability. Finally, following Lavoie (2006), we end up by looking at long-run issues such as the dynamics of potential growth. We integrate previous Lavoie analysis by considering the interaction between long-run growth potential and the evolution of public debt stock.

The paper is organized as follows. Section 2 introduces a simple post-Keynesian short-run macro model, which tries to explain the connections between the financial system and the real side of an economy. Section 3 models the Minsky-type financial instability hypothesis and the effectiveness of government policies in the aftermath of the 2007 sub-prime financial crisis. Section 4 extend the analysis to the long run and to the interplay between long-term growth potential and public debt sustainability, in the EURO zone in particular. Section 5 concludes.

2. A simple post-Keynesian macro model

There is general consensus among economists, both from a mainstream perspective and from an heterodox approach, as to the behavior of monetary authorities. Using Romer (2000) own words, we can convincingly affirm that Central Banks, rather than pursuing money aggregate targets, now "follow a real interest rate rule; that is, they act to make the real interest rate behave in a certain way as a function of macroeconomic variables such as inflation and output (Romer, 2000, p. 154)". To this end, they (Central Banks) "focus on the interest rate on loans between banks in their short-run policy-making (and) use the nominal interbank rate as their short-term instrument (Romer, 2000, p. 155)".

From an analytical standpoint, such a behavior of monetary authorities is generally modeled through the well-known Taylor rule, which makes Central Banks' discount rate a function of some inflation and output targets (or, better, of the discrepancies between current inflation and economic performance with respect to their own corresponding targets). In this regard, the present work does not introduce any exception. Following Lavoie (2006), we assume equation (1) below to model Central Bank monetary policy:

$$i_{cb} = i_0 + \alpha(\pi - \pi^T) + \beta(g - g_n) \qquad (1)$$

According to equation (1), Central Bank sets the discount rate i_{cb} on loans to financial institutions, commercial banks mostly, by taking into account several factors. First, Central Bank discount rate is a positive function of the gap between current inflation rate π and the inflation target π^T pursued by monetary authorities. Second, the discount rate i_{cb} also changes on the base of the existing output gap, here modeled as the difference between current economic growth g and potential growth g_n. In question (1), Parameters α and β stand for the sensitivity of the Central Bank reaction function to the inflation target and output target respectively. Finally, parameter i_0 stands for a sort of Wickselian long-run interest rate set by Central Bank once both the inflation and output target are met (i.e. π is equal to π^T and g corresponds to potential growth g_n).

Central Bank decisions obviously influence financial operator credit policies. According to the endogenous money theory, here we assume financial operators, commercial banks in particular, to set the interest rate i_L on loans by applying a mark-up rate m on the discount rate from the Central Bank. This is stated in equation (2). Equation (3), in turn, gives us with the "effective" or "credit-worthy" demand for loans L^P from private actors which will be accepted by financial institutions at the ruling interest rate i_L.

$$i_L = (1 + m)i_{cb} \tag{2}$$

$$L^P = \gamma - \delta(i_L - \pi^e) \tag{3}$$

As usual, we assume the effective demand for credit as a negative function of the real interest rate, here stated as the difference between the nominal interest rate on bank loans i_L and expected inflation π^e. In equation (3), parameter γ represents all those factors, let's say institutional factors independent from the interest rate, which influence economic agent access to credit. In this sense, note that, besides loans to non-financial institutions, households and firms basically, we include in L^P also inter-banks credits. Actually, whilst these kind of credits are neglected in most economic models due to the difficulties to formally describe or account for them in stock-flow-consistent exercises, we consider such flows fundamental to explain the ongoing behavior of financial institutions and the ensuing effects on the real sphere of the economy. We finally stress that in this part of the model we maintain the traditional assumption of constant values of the parameters defining the functioning of financial systems, parameters γ and m in particular. Such an assumption will be abandoned later on, when we will formally describe the destabilizing processes that more frequently distress worldwide financial systems.

Financial institutions do not provide credits to private actors only. They also finance public deficit in exchange of T-bonds. In equation (4), L^G stands for total financial needs of domestic governments, which depend on two components: primary deficit Δ and interest payments on the stock of accumulated debt D.

$$L^G = \Delta(G, T, i_L, d) + i_L D = \nu(G, T, d) - \rho(i_L - \pi^e) + i_L D \tag{4}$$

In equation (4), primary deficit Δ obviously depends positively on government purchases G for both current expenditures and public investments, and negatively on taxation level T. Beside this, we also assume that policy makers may be induced to reduce primary deficit, and eventually run a surplus (i.e. in this paper a negative value of Δ), the higher is the prevailing interest rate i_L or the higher is public debt-to-GDP ratio (D/Y)=d.

Last but not least, equation (5) below describes the current growth rate of the economic system g. According to Lavoie (2006), it may represent a sort of IS curve expressed in growth terms. Following Fontana and Setterfield (2009), we assume g to depend positively on the amount of loans given by financial institutions to private actors L^P as well as on government primary deficit. Actually, the higher is financial support L^P given to private economic agents, the higher will likely be consumption and investment expenditures and therefore demand injections stimulating economic growth. Secondly, easy financing of public financial needs may allowed governments to run larger primary deficits and thus to scale up those expenditures, let say public investments, which may have direct positive effects on growth performances g.

$$g = f(L^P, \Delta) = \xi + \theta L^P + \lambda\Delta \tag{5}$$

From a mathematical point of view, substituting equations (3) and (4) in (5) and rearranging, it is easy to see the negative relationship that eventually links the prevailing interest rate i_L to current economic growth g. This is explicitly stated in equation (6):

$$g = \xi + \theta\gamma + \lambda v(G,T,d) - (\theta\delta + \lambda\rho)(i_L - \pi^e) = g_0(G,T,d) - \mu(i_L - \pi^e) \quad (6)$$

With $g_0 = \xi + \theta\gamma + \lambda v(G,T,d)$ and $\mu = \theta\delta + \lambda\rho$.

In the present model we have so far neglected inflation issues. As to price dynamics, let first assume that economic agents judge Central Bank behavior reliable and credible, so that $\pi^e = \pi^T$. Moreover, following Lavoie (2006), let assume that Central Bank is capable to properly set parameter i_0 in order to meet the inflation target in the long run when current economic growth is equal to potential growth. Substituting equation (4) in (6), putting $g=g_n$ and replacing the result in (1), we get:

$$i_0 = \frac{(g_0 - g_n) + \mu\pi^T}{\mu(1+m)} \quad (7)$$

In the short run, however, current inflation may obviously depart from its targeted long-run value. In this paper, we describe inflation dynamics as depending on the inter-play between demand and supply forces. We model this point through equation (8) below:

$$(\pi - \pi^T) = \psi(g - g_n) \quad (8)$$

Equation (8) is a sort of short-run Philips curve. According to it, current inflation accelerates and it is higher than long-run target inflation should current economic growth be higher than potential growth. On the contrary, inflation decelerates and it is temporary lower than π^T in case of current economic growth below potential. Parameter ψ stands for the sensitivity of current inflation to discrepancies between current economic growth and potential growth[1].

Above equations (1), (2), (3), (4), (6) and (8) form a system of 6 equations in 6 endogenous variables: i_{cb}, i_L, L^P, L^G, π and g. Substituting equation (8) in (1), putting the result in (2) and then in (6), we can find a clear expression for economic growth in the short run:

$$g = \frac{g_0 - \mu\{(1+m)[i_0 - (\beta + \alpha\psi)g_n - \pi^T]\}}{1 + \mu(1+m)(\beta + \alpha\psi)} \quad (9)$$

Equation (9) simply states that current economic growth is a positive function of g_0, and therefore of government purchases G for both current expenditures and public investment. On the contrary, g reacts negatively to heavier taxation T and to a higher public debt/GDP ratio d, which may persuade domestic policy-makers to reduce primary deficits. Easy credit market conditions, as represented by a low value of the mark-up rate parameter m and a high value of the intercept parameter γ in the effective credit demand function (3) favor growth. The possibility for economic agents to have easy access to credit facilities may induce them to

[1] Equation (8) is logically equivalent to the description of inflation dynamics provided by Lavoie (2006).

increase consumption expenditures as well as implement higher and more numerous investment plans, thus raising aggregate demand and eventually aggregate production. Finally, current economic growth increases the higher is growth potential g_n and the less stringent is inflation target set by Central Bank (i.e. the higher is π^T).

3. The endogenous instability of financial systems.

In the short-run model above we have assumed operating conditions of financial systems to be given. In particular, we have imagined constant values of both the mark-up rate m applied by financial institutions on loans and of parameter γ in the effective credit demand function. Actually, this is a standard assumption in most heterodox models and it sounds reasonable in times of financial stability and tranquility. However, it surely appears too restrictive in periods of strong financial turbulences like those emerged from the outbreak of the 2007 subprime crisis on and, more in general, at odds with the intrinsic instability dynamics that, from decades, seem to affect financial systems (Minsky, 1989). Let us therefore depart a bit from the simple scenario introduced above and try to formally describe what Kregel (2007) defines as the "natural instability of financial markets".

According to Wray (2007), Brancaccio and Fontana (2010), several institutional changes and innovations have recently affected the functioning of financial systems. First of all, a long-run process of deregulation has been implemented from the seventies on. Segmentations of financial markets have been removed and barriers between commercial banks, investment banks and other financial institutions became weaker and weaker. As a consequence, commercial banks have been increasingly involved in a much wider range of financial activities including participation to long-term and speculative financial markets. Investment banks and speculative agents have had the opportunity to access short-term borrowing. Secondly, a deep process of securitization of existing loans has taken place inducing a "create and distribute" practice to replace previous "create and hold" behavior of financial institutions. Complex structured financial instruments such as collateralized-debt-obligations (CDO) have widespread on financial markets and composed a growing asset part in the balance sheet of most financial institutions worldwide.

While a favorable macroeconomic climate featuring low interest rates and easy money may perhaps have favored the diffusion of such financial innovations, deregulation and securitization processes themselves have probably contribute to expand credit and liquidity creation even further, to feed asset price booms, ultimately to set the conditions for instability to overtake financial systems[2]. Such destabilizing processes are formally described in equations (10) and (11) below.

[2] The expansion of mortgage markets, as due to the possibility of packaging and distributing worldwide conceded loans through collateralized debt obligations, undoubtedly played a leading role in feeding the US housing boom. High and growing house prices, in turn, have induced financial operators to assess CDO instruments as risk-free, thus raising their price and their diffusion in the balance sheet of financial institutions. Also due to the pro-cyclical mechanisms of the Basle II agreement, these facts have allowed to further expand credit facilities, to underestimate existing risks, to reduce prudential measures, ultimately to raise financial instability.

Let assume that parameters γ and m, even though constant in the short run, may be subjected to revision by financial operators in the medium run. Let assume, moreover, that such adjustments depend on the prices of the assets in the balance sheet of financial institutions and of perceived overall financial risks. More in details, we have:

$$\dot{\gamma} = f\left(P^P\left(L^P(\gamma, m)\right), P^G, r\right) = f(\gamma, m, P^G, r) \quad (10)$$

With $\frac{\partial f}{\partial P^P} > 0, \frac{\partial f}{\partial P^G} > 0, \frac{\partial f}{\partial r} < 0$ and $\frac{\partial P^G}{\partial L^P} > 0$

$$\dot{m} = z(P^P(L^P(\gamma, m)), P^G, r) = z(\gamma, m, P^G, r) \quad (11)$$

With $\frac{\partial z}{\partial P^P} < 0, \frac{\partial z}{\partial P^G} < 0, \frac{\partial z}{\partial r} > 0$

In equations (10) and (11), P^P represents the average price of asset-backed securities, i.e. collateralized debt obligations, increasingly included in the balance sheet of most financial operators, commercial banks as well. In equation (10), increasing prices of asset-backed securities induce financial operators to upscale parameter γ, to reduce conditions set on credit demands and ultimately to expand loans. In equation (11), on the contrary, increasing P^P values cause a downward adjustment and a reduction in the mark-up rate m charged on private loans. Moreover, following Kregel (2007)[3], let assume P^P to be a positive function of the total amount of loans L^P given to private agents and fuelling mortgage markets, consumption credit facilities ect…ect. As said, easy credit to households, firms or other financial business activities may boost their consumption, investment and "speculative" decisions, increase the price of mobile and immobile assets, eventually raise the price P^P of connected financial assets. On the base of this casual chain, it turns out to be clear that increasing values of γ feed back positively on its own adjustment process whilst tend to reduce m. On the contrary, higher m values may produce huge credit market contractions by leading to downward revise γ and further increase bank mark-up rate. These mechanisms are clearly destabilizing.

In equations (10) and (11), P^G stands for the market price of T-bonds acquired by financial operators in order to meet government financial needs. Again, a positive and negative relationship connects P^G to adjustments in parameters γ and m, respectively. Increasing T-bond prices, for instance, by improving financial operators balance sheets, may induce credit institutions to expand the set of acceptable credit demands and, at the same time, to reduce profit margins on conceded loans.

Finally, r represents a general indicator of risk and uncertainty as perceived by financial operators and considered to adjust their own credit policies. In equations (10) and (11), we assume increasing risks and uncertainty, i.e. higher r values, to induce more conservative, prudent and restrictive credit policies. Parameter γ in the effective credit demand function would be easily cut and the mark-up rate m on loans increased.

[3] Kregel (2007) describes the feedback circular mechanism between expanding bank loans and growing real estate and asset prices at the base of the financial euphoria preceding and then causing the 1929 Stock Exchange crash. These mechanisms are pretty much similar to those emerged in the most recent episodes of financial crises.

In order to assess the stability properties of the two-equation dynamic system above we have to compute the corresponding Jacobian matrix of partial derivatives in the neighborhood of the steady state. According to the analysis above, we get:

$$J = \begin{bmatrix} \frac{\partial f}{\partial \gamma} & \frac{\partial f}{\partial m} \\ \frac{\partial z}{\partial \gamma} & \frac{\partial z}{\partial m} \end{bmatrix}$$

Two possible scenarios arise. A locally unstable equilibrium exists if *det.*(*J*)>0 and *Tr.*(*J*)>0. Whilst the matrix trace is surely positive, given that $Tr.(J) = (\partial f/\partial \gamma) + (\partial z/\partial m) > 0$, the first condition requires that $(\partial f/\partial \gamma)(\partial z/\partial m) - (\partial z/\partial \gamma)(\partial f/\partial m) > 0$, or, alternatively, $-\frac{\partial z/\partial m}{\partial z/\partial \gamma} > -\frac{\partial f/\partial m}{\partial f/\partial \gamma}$, i.e. the locus for constant values of *m* is positively sloped and steeper than the locus for constant values of γ in the (m,γ) space. On the contrary, if the determinant of matrix *J* turns out to be negative, an unstable saddle-path dynamics emerges. Graphically, this would apply should the locus for constant values of γ be steeper than the locus for constant values of *m* in the (m,γ) space, i.e. $-\frac{\partial z/\partial m}{\partial z/\partial \gamma} < -\frac{\partial f/\partial m}{\partial f/\partial \gamma}$. These two possibilities are graphically portrayed in charts 1 and 2 below: figure 1 reports the case for a locally unstable equilibrium and figure 2 represents the case for a saddle-path dynamics.

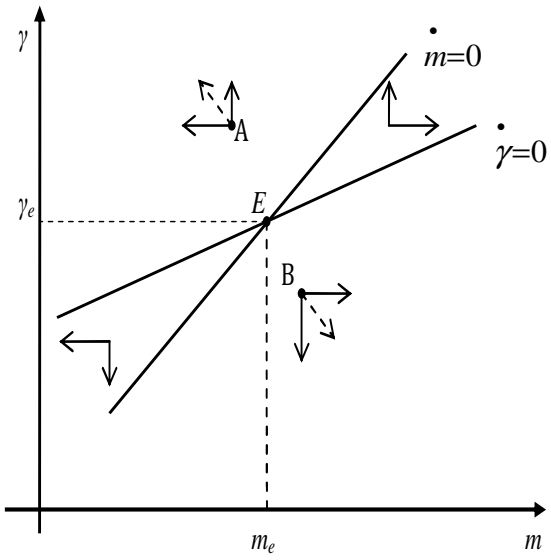

Figure 1 – Locally unstable dynamics on financial markets

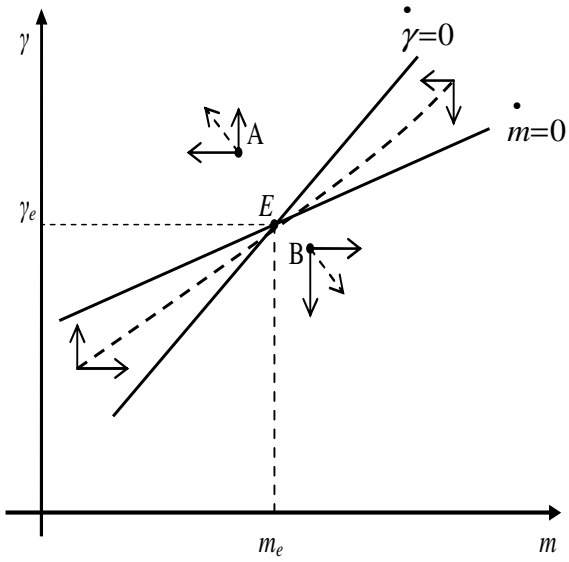

Figure 2 – Saddle-path unstable dynamics on financial markets

Perhaps more relevant than the technical aspects above, it is the intrinsic instability characterizing financial systems. Actually, financial systems are stable, i.e. they feature constant values of their own operational parameters γ and m, so long as they lie in the equilibrium point E. However, should any shock hit them, destabilizing mechanisms will be set in motion. Financial systems will easily give rise to either euphoric dynamics or financial collapses unless they would be moved, by chance, on the saddle-path bringing back to equilibrium (obviously, this possibility applies in case of figure 2 only). In point A, for instance, process of irrational euphoria may take place. First, financial operators will tend to cut profit margins on loans and make credit cheaper. Second, effective credit demand will expand thanks to lower credit conditionalities, let's say the introduction of low-doc or no-doc procedures on mortgage market. As a result, credit flows increase hugely and liquidity floods financial markets. Asset prices will likely increase giving rise to a new round of expansion of credits in an apparently endless process. In point B, on the contrary, all the conditions for a tremendous credit crunch are at work. Increasing mark-up rates on loans make interest rates increase vigorously. At the same time, credit conditionality becomes tighter and tighter. Credit lines are cut and credit market dried. Asset prices decrease, exacerbating capital losses in financial operators balance sheets and further search for liquidity. Without the strong intervention of public authorities, credit markets would probably stop to work at all[4].

Even worse, there are concrete possibilities that credit booms eventually set the conditions for subsequent contractions and may likely leave the stage to credit crunches[5]. Actually,

[4] According to Brancaccio and Fontana (2011), this is what happened in July 2007, when French Bank BNP Paribas stopped to reimburse some of its institutional funds due to exposure to US sub-prime obligations, and, even worse, in September 2008 after the failure of Lehman Brothers Investment bank. These events induced interest rates to tremendously skyrocket on inter-bank credit markets and a dramatic halt in credit operations.

[5] According to Minsky itself, "there is, in the financial stability hypothesis, a theory of how a capitalist economy endogenously generates a financial structure which is susceptible to financial crises, and how the normal functioning of financial markets in the resulting boom economy trigger a financial crisis (Minsky, 1982, p.68)".

following Wray (2007), financial markets euphoria is usually associated to increasing leverage and risky positions[6]. Even if increasing risks may be temporally blurred by the complex technicalities of new financial instruments[7], soon or later they will emerge and be incorporated in financial operator decisions. In this model, according to equations (10) and (11), abrupt revisions in perceived systemic risks will provoke immediate increases in the mark-up rate on loans and a marked tightening of credit conditionality. Graphically, according to figure 3 below, both locus for constant values of m and γ will move upward, passing from $(\dot{m} = 0)$ and $(\dot{\gamma} = 0)$ to $(\dot{m}^1 = 0)$ and $(\dot{\gamma}^1 = 0)$, respectively. A credit boom, like that represent in point A, may be suddenly transformed in mounting financial markets distress.

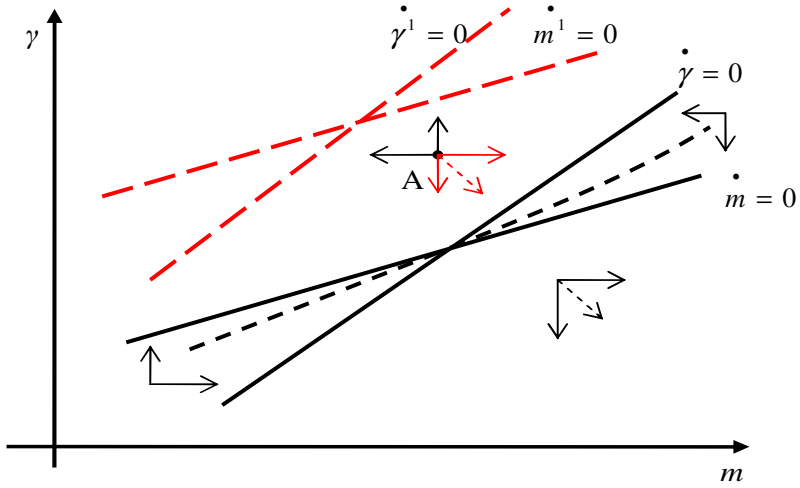

Figure 3 – Credit booms, increasing financial risks and the outbreak of financial crises

It goes without saying that the outbreak of financial crises may have disruptive consequences on the real side of the economy, on economic growth in particular. According to the short-run analysis above, whilst credit booms favor real economy expansions, the contraction of the effective credit demand and increasing mark-up rate on loans and therefore higher interest rate simply cut growth and possibly induce economic recessions with the ensuing social costs.

[6] Randal Wray, in describing the mechanisms at the base of the 2007 sub-prime crisis, clearly states that "(financial) innovations expanded the supply of loans, fueled homebuying and drove up the value of real estate, which increased the size of loans required and justified rising leverage ratios [...] the combination of low interest rates and rising real estate prices encouraged a speculative frenzy (Wray, 2007, p. 11)". Ultimately, "the current crisis is a natural outcome of these processes – an unsustainable explosion of real estate prices, mortgage debt and leverage positions in collateralized securities (Wray, 2007, p. 2)"

[7] See again Brancaccio and Fontana (2011) on the apparently risk-reducing composition techniques characterizing the construction of asset-backed securities. Actually, in 2007, close to the 60 percent of new structured finance instruments got a triple A rating, i.e. the highest level of security.

3.1 Effectiveness of financial systems rescue programs and the ongoing sovereign debts crisis

"The most significant economic event of the era since World War II is something that has not happened: there has not been a deep and long-lasting depression (Minsky, 1982, introduction)". In 1982, Minsky used these words to express the capability of economic policy institutions to tame the destabilizing financial processes above and to maintain economies in equilibrium (or, in terms of the present model, on the saddle-path leading to it). According to Minsky, this was possible thanks to an institutional arrangement featuring a "Big Government", i.e. government authorities maintaining pretty stable economic dynamics and profit levels through expansionary fiscal stances and budget deficits, and a "Big Bank", i.e. Central Banks recurrently acting as lenders of last resort of a widening range of financial operators.

Something similar seems to have been in place since 2007. Actually, most governments worldwide have been involved into costly programs to rescue financial systems from failure and, in a lesser extent, to stimulate economic recovery. Several banks and financial institutions have been de-facto nationalized. At the same time, Central Banks have strongly reduced discount rates and provided extraordinary credit facilities to financial operators. Three years later the outbreak of the sub-prime crisis, however, there is a mounting debate on the effectiveness of these policies and institutional arrangements. Actually, several economic institutions now are compellingly asking for a fast departures from alleged expansionary Keynesian policies and for a quick implementation of restrictive deficit/debt reducing fiscal policies (IMF, 2010; European Commission, 2010)[8]. Proposals go as far ahead as to demand the introduction of a zero-deficit commitment into countries' constitutional papers.

Before analyzing some aspects of this debate, a conceptual premise is needed. Although the expansionary and deficit spending fiscal policies cited above are generally labeled as Keynesian, most of them actually are not. Financial system rescue packages, even though attempting to re-establish the normal functioning of financial markets and hence of the economy as a whole, do not directly provide demand injections counteracting the economic downturn. According to the European Commission (2009), public help to financial institutions was in the range of 5-10 percent of GDP in several member countries. According to a report of the Bank for International Settlements published in July 2009, numbers are extraordinary higher in countries like UK, where outlays have amounted to something like the 44 percent of national GDP. By mid 2009, on the contrary, discretional fiscal stimuli to economic recovery reached 1,8 percent of EU-27 GDP only. Typical anti-cyclical Keynesian measures such as huge public investment programs have been largely neglected with respect to other initiatives (European Commission, 2009). Actually, we think the surging rejection of Keynesian-type

[8] The IMF, in its World Economic Outlook published in October 2010 states: "Fiscal consolidation needs to start in earliest 2001. Of utmost importance are firm commitments to ambitious and credible strategies to lower fiscal deficits over the medium term […]This task is now more urgent than it was six months ago (IMF, 2010, p. 37)". Similarly, according to the European Commission (2010): "even in countries with lower government debt ratios a general consensus view has taken hold that large consolidations are now required to bring fiscal positions back on a sustainable path. Although the fiscal stimulus packages were not the main driving factor behind the deterioration in fiscal positions – and had probably only a relatively minor impact on fiscal positions - calls for a fiscal exit have become stronger (EU, 2010, p. 1)".

policies may be too premature and, above all, theoretically ungrounded. It should more carefully consider the real nature of most of the policies implemented after 2007.

Perhaps more importantly, the financial sector stabilization packages adopted so far have proved to be largely useless to restore tranquility on financial markets, as the ongoing sovereign debt crisis seems to witness. In a way, public intervention in favor of financial operators, although unavoidable and necessary, have transformed a prevalently private-agent financial dislocation in a public collective problem.

According to the analytical framework above, let assume that governments issue new T-bonds in an amount equal to N in exchange of toxic activities in the balance sheet of financial operators. Other way round, think new T-Bonds issuances to be used to finance nationalization programs or public guaranties over risky financial assets. On the one hand, these measures can obviously improve balance sheets of financial operators by increasing the average market price P^P of their private assets and perhaps reducing a bit the perceived systemic risk r. On the other hand, however, government help also implies that the burden of private agents financial dislocation is now shifted and charged on the shoulders of the collectivity at the cost of higher public deficits and of an increasing debt/GDP ratio. In such a context, the price P^G of T-bonds may easily decrease should people start to fear about public finance solidity and public deficits are believed excessive and unsustainable. T-Bonds of some countries, let say PIIGS countries, may start to be downgraded as junk bond and a sovereign debt problem develop, throwing back the financial system in a worrying condition of financial distress. The overall effect of public help on financial sector stability turns out to be largely unclear.

More formally, the first set of derivatives below tries to define the first positive effects that public help may produce on financial sector stability by alleviating financial institutions insolvencies on their private assets:

$$\left.\frac{\partial \gamma}{\partial N}\right|_{\dot{\gamma}=0} = -\frac{\frac{\partial f}{\partial P^P}\frac{\partial P^P}{\partial N}+\frac{\partial f}{\partial r}\frac{\partial r}{\partial N}}{\partial f/\partial \gamma} < 0$$

And

$$\left.\frac{\partial \gamma}{\partial N}\right|_{\dot{m}=0} = -\frac{\frac{\partial z}{\partial P^P}\frac{\partial P^P}{\partial N}+\frac{\partial z}{\partial r}\frac{\partial r}{\partial N}}{\partial z/\partial \gamma} < 0$$

With $\frac{\partial P^P}{\partial N} > 0, \frac{\partial r}{\partial N} < 0$

In figure 4, such a positive effect is represented by the simultaneous downward movement of the two loci for constant values of γ and m. Suppose the economy to rely in point A: the ongoing credit contraction is reverted and the basis for a new round of credit expansion and economic recovery may be established.

The two derivatives below, on the contrary, stand for the perverse effects of public intervention on financial market stability via excessive public deficits and decreasing T-bond prices P^G.

$$\left.\frac{\partial \gamma}{\partial N}\right|_{\dot{\gamma}=0} = -\frac{\frac{\partial f}{\partial P^G}\frac{\partial P^G}{\partial N}}{\partial f/\partial \gamma} > 0$$

And

$$\left.\frac{\partial m}{\partial N}\right|_{\dot{m}=0} = -\frac{\frac{\partial z}{\partial P^G}\frac{\partial P^G}{\partial N}}{\partial z/\partial \gamma} > 0$$

With $\frac{\partial P^G}{\partial N} < 0$.

On the base of equations (10) and (11), lower P^G values will move the loci for constant values of γ and m up. If these movements are sufficiently strong, i.e. financial operators become highly skeptical about public debt solidity, the causes of financial instability will not be removed. At the end, the initial positive effect of government intervention to rescue financial institutions may be likely displaced and compensated by the negative consequences of an emerging public debt crisis.

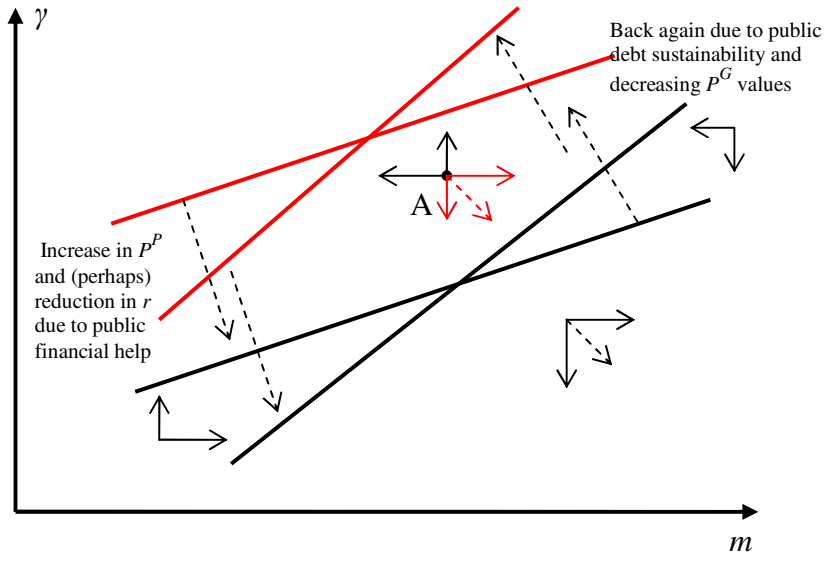

Figure 4 – Positive and negative effects of financial system rescue fiscal packages

4. A look at the long run: potential growth, public debt sustainability and the effects of Eurobond issuances.

The present worldwide economic context is probably the worst scenario policy-makers have to tackle with since the 1929 Great Depression. This seems to be particularly true inside the European Union, in which several member states appear to be incapable to simultaneously deal with the long-lasting consequences of the 2007 sub-prime crisis and the

surging sovereign debt crisis[9]. On the one side, due to persisting disappointing economic performances, these governments would adopt expansionary fiscal policies to stimulate aggregate demand and boost economic growth. Such measures, however, can hardly be implemented due to the high concern of financial markets about public debt sustainability. Actually, increasing financial tensions may even worsen the economic environment and make any anti-cyclical deficit spending attempt ineffective. On the other side, financial turbulences have induced highly indebted countries to quickly move from expansionary fiscal stances to public balance consolidation in order to restore their own financial credibility. Fiscal restrictions, however, likely produce contractionary effects on economic activity and the economy may enter in a perverse cycle: economic recovery may stall and set additional strain on public balance solidity; a new round of restrictive measures is considered; ultimately, economic activity stagnates and decreases even further.

What we have just described looks like a dramatic no-way-out trap. In such a context, the only exit strategy is probably a profound institutional discontinuity. Actually, when economic mechanisms prove to be incapable to self-stabilize, changes are to introduce in the institutional framework surrounding market processes, in the set of policies implementable by economic authorities and in the range of tools at their disposal[10]. In the last months, one of the perhaps most intriguing and hotly debated reform proposal is the introduction of a new financial instrument such as Eurobonds.

In this paper, we don't want to see in details the technicalities and the institutional-financial architecture surrounding the possibly future issuances of Eurobonds[11]. For the time being, let simply define them as liabilities issued by an European Debt Authority and collectively guaranteed by all EU member States in order to help recovery efforts of national governments by financing long-term investment projects[12]. On the contrary, let try to describe in a simple, perhaps rough but intuitive way the long-run effects of such proposal on the sustainability of EU member States debt and on their growth potential. To do so, imagine a two-equation dynamic system describing the long-run evolution of the potential growth rate g_n and of the debt-to-GDP ratio d. Consider the long-run growth potential first.

Equation (12) below describes the dynamics of long-run growth potential. It is identical to a previous formalization by Lavoie (2006) and is grounded on a pretty considerable and growing body of literature on the endogenous nature of long-run growth potential (Flaschel, 2000; Leon-Ledesma and Thirlwall, 2002). Actually, following Leon-Ledesma and Thirlwall (2002), a positive relationship seems to connect current economic growth g to the natural growth rate g_n, as empirically witnessed by the upward (downward) dynamics the latter shows in period of economic boom (recession). In a way, it seems that "growth creates its own

[9] These difficulties appear particularly relevant for some countries in the European Monetary Union, due to the fact they have lost control of monetary policy and do not manage any longer the currency their T-bonds are denominated in. According to De Grauwe (2011a), this fact actually put these countries in the same uncomfortable situation characterizing several emerging economies in the past.

[10] According to Mayer (2009), it is interesting to note that most advances and progresses in the EU building process were realized during periods of deep economic instability and/or political tensions.

[11] See Favero and Missale (2010) on this point and for a discussion of competing proposals as that proposed by De Grauwe and Moesen (2009).

[12] See Rodriguez (2010) on such a proposal for Eurobond-financed "long-term key investments needed to promote the transition to a more low-carbon, knowledge-intensive and inclusive growth model (Rodriguez, 2010, p. 7)".

resources in the form of increased labor force availability and higher productivity of the labor force (Leon-Ledesma and Thirlwall, 2002, p. 452)". Accordingly, in equation (12) we assume long-run growth potential to increase should current economic growth be higher than potential growth itself, therefore promoting innovations and labor productivity-enhancing technological progress. On the opposite, long-run growth potential will likely stagnate and decrease should the economy work below its full-employment possibilities.

$$\dot{g_n} = \chi(g(g_n, d) - g_n) \tag{12}$$

With $\frac{\partial g}{\partial d} < 0$

In equation (12), we assume the debt-to-GDP ratio d to play a role in affecting long-run growth dynamics. Actually, we have already stressed that high debt-to-GDP ratios may somehow induce reductions in fiscal primary deficits by persuading policy-makers not to increase public debt stock (in percentage of GDP) even further. These effects, by curtailing demand injections (the difference (G-T) in standard national accounting) may easily dampen economic growth. Besides this, high debt-to-GDP ratios may discourage current economic growth through several other channels such as increasing country risk premium due to uncertain public debt solidity or negative household and firms expectations about future rises in taxation and reductions in disposable income. In general, a negative relationship between d, g and therefore potential growth dynamics may stand out. This is exactly what we assume.

As to the evolution of the debt-to-GDP ratio, it is formally stated in equation (13) below:

$$\dot{d} = \frac{L^G}{D} - g = \frac{\Delta(d) + i_L D}{D} - g = \frac{\Delta/Y}{D/Y} + i_L - g = \frac{\Omega(d)}{d} + i_L - g(g_n, d) \tag{13}$$

With $\Omega = \left(\frac{\Delta}{Y}\right)$; $\frac{\partial \Omega}{\partial d} < 0$ and $\lim_{d \to 0}(\partial(\Omega/d)/\partial d) = \frac{(\partial\Omega/\partial d)d - \Omega}{d^2} = -\infty$ [13]

$$\lim_{d \to \infty}(\partial(\Omega/d)/\partial d) = \frac{(\partial\Omega/\partial d)d - \Omega}{d^2} = \frac{(\partial\Omega/\partial \mathrm{d})}{d} - \frac{\Omega}{d^2} = 0$$

Mathematically, equation (13) simply states that the growth rate of the debt-to-GDP ratio is nothing but the difference between the growth rate of public debt stock (L^G/D) and the current economic growth rate g. From an economic point of view, equation (13) says that debt-to-GDP ratio dynamics depends on both growth potential g_n and the debt-to-GDP ratio d itself. The relationship between g_n and $\dot{d}$ is obviously negative. A higher long-run growth potential g_n, by feeding current economic expansion g via equation (9), will tend to reduce the debt-to-GDP ratio across time. The effects of the debt-to-GDP ratio on its own dynamics, on the contrary, turn out to be uncertain. In equation (13), we assume a high level of public debt-to-GDP ratio to induce economic authorities to reduce primary deficit Δ (or to run primary budget surpluses) and therefore to lower the primary deficit-to-GDP ratio Ω as well. This fact implies that a stabilizing and negative effect of outstanding debt (as a percentage of GDP) on its own dynamics exist. At the same time, however, higher public debt levels curtail current

[13] Here we assume the primary deficit Δ = (G-T) to be generally positive at pretty low values of public debt stock d, so that the primary deficit-to-GDP ratio Ω turns out to be positive as well.

economic growth, this way alimenting explosive forces. The two derivatives below help us to mathematically address this problem.

$$\left.\frac{\partial g_n}{\partial d}\right|_{g_n=0} = -\frac{\partial g/\partial d}{\frac{\partial g}{\partial g_n}-1} = \frac{\partial g/\partial d}{\left[1-\frac{\mu(1+m)(\beta+\alpha\psi)}{1+\mu(1+m)(\beta+\alpha\psi)}\right]} = [1+\mu(1+m)(\beta+\alpha\psi)](\frac{\partial g}{\partial d}) \quad (14)$$

$$\left.\frac{\partial g_n}{\partial d}\right|_{\dot{d}=0} = -\frac{[(\partial(\Omega/d)/\partial d)-(\partial g/\partial d))]}{-(\partial g/\partial g_n)} = \frac{1+\mu(1+m)(\beta+\alpha\psi)}{\mu(1+m)(\beta+\alpha\psi)}[(\partial(\Omega/d)/\partial d)-(\partial g/\partial d))] \quad (15)$$

Equation (14) defines the slope of the locus for constant values of potential growth g_n. The sign of equation (14) turns out to be undoubtedly negative, given that $(\partial g/\partial d) < 0$.

Equation (15) gives us the slope of the locus for constant values of the debt-to-GDP ratio. As said, its sign is not clear. However, we may generally believe it to be negative at low levels of *d*: the first stabilizing effect will outstrips the explosive one[14]. At higher values of *d*, however, the initial negative sign of equation (15) likely turns into positive. The first stabilizing effects, in fact, will lose relevance when applied to a considerable public debt stock and the second destabilizing one, i.e. $(\partial g/\partial d)$, prevail. Eventually, what emerges is a U-shaped locus for constant values of the debt-to-GDP ratio.

Chart 5 below portrays these two loci and the ensuing long-run equilibria when they intersect each other:

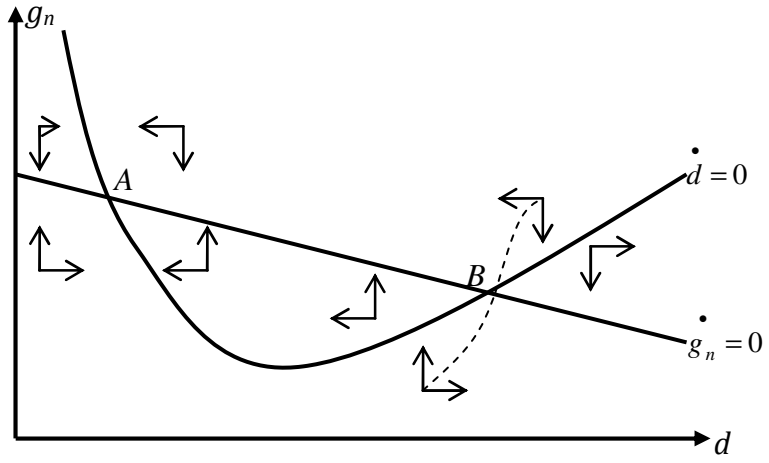

Figure 5 – Multiple long-run equilibria

According to the analysis above, let assume the loci for constant values of *g* and *d* intersect twice. In this case, two long-run equilibria emerge. Equilibrium *A* is a "virtuous" locally stable equilibrium, in which the economic system presents a high long-run growth potential and features a stable low value of the public debt-to-GDP ratio. We can say exactly the opposite about the perverse equilibrium *B*, which is characterized by lower long-run growth potential and a much higher burden of public debt (as a percentage of GDP). Beside this, equilibrium *B*

[14] Actually, when *d* is pretty small, slightly higher values of *d* will reduce *Ω* and therefore induce a remarkable drop in the growth rate of the public debt stock *Ω/d*.

shows a risky unstable saddle-path dynamics. Economic shocks that would temporally bring the economy to the right of equilibrium B will likely give rise to disastrous economic processes in which declining long-run growth potential and mounting public debt feed back each other and lead, soon or later, to dramatic public default episodes.

Perhaps even more interesting is to assess the long-run consequences of the financial turbulences described in section 3. Actually, it is easy to see that reductions in the effective credit demand (i.e. lower values of parameter γ) and increases of the mark-up rate on loans (i.e. rising values of m) may produce long-lasting disruptive consequences on the whole economy. First, the credit crunch weakens current economic growth and therefore, via equation (12), reduces the long-run growth potential. At the same time, through equation (13), it also induces the debt-to-GDP ratio to increase. Second, we already know the perverse effects that higher m values will induce on current growth (see equation (9)) and therefore on the long-run growth potential and the public debt sustainability. In this regard, here we also remark an additional destabilizing mechanism connecting m to $\dot{d}$. Actually, the higher is m, the higher will be the interest rate i_L on loans and the costlier will be debt service (see equation (13)). It is all but a rare phenomenon to see increasing interest payments on outstanding debts to trigger a dramatic self-feeding process towards debt default.

From a graphical perspective, see figure 6, all these mechanism simply act to move the locus for constant values of the debt-to-GDP ratio upward. At the same time, the locus for constant values of g_n will move down. If sufficiently strong, and this may be the case of financial market panic and "fight to safety" sentiments, these movements may induce the two loci not to intersect any longer. Long-run equilibria disappear. More interesting, regardless from the initial positions the economy is, a market-led run to economic disaster will take place.

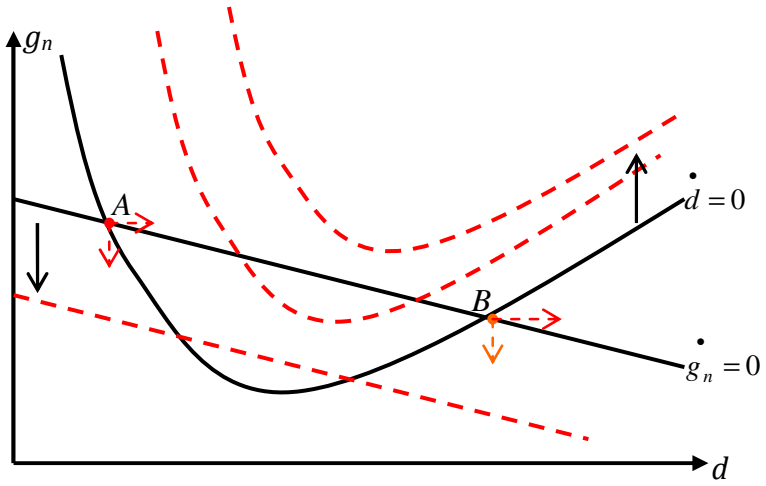

Figure 6 – Long-run consequences of financial panic

4.1. Macroeconomic implications of Eurobond issuances

Once described the gloomy scenario represented in figure 6, let's now move to the Eurobond issue. As anticipated above, let simply describe Eurobonds as financial instruments through which financial resources may be quickly channeled towards EU member countries without directly affecting their own public finance balance. Moreover, let assume these resources to be employed to implement counter-cyclical fiscal policies, say ambitious competitiveness-enhancing public investments, which otherwise should have been financed by issuing national bonds.

According to our analytical framework, such an exogenous help would have a double impact on the dynamic system at hand. First, current economic growth may recover, this way biding up long-run growth potential dynamics. Second, while this same effect will also ease public debt management, a further positive effect will emerge due, possibly, to the stabilization of financial systems. Actually, EU financial assistance to member States through the Eurobond vehicle may help financial institutions to acquire a deeper sense of tranquility and believe the Euro project as solid. As a consequence, the credit market interest rate i_L may decrease and help member countries to lower the debt-to-GDP ratio without the adoption of draconian and socially costly restrictive fiscal policies.

To concretely see the economic consequences of the Eurobond novelty, consider again the multiple equilibria scenario portrayed in figure 5 and the corresponding equations (13) and (14). Define as "E" the amount of resources conveyed towards a member country through the Eurobond instrument by EU institutions in order to implement long-run pro-growth policies. On the one hand, such an exogenous intervention, by changing let say parameter g_0, influence current economic growth and therefore long-run growth dynamics via equation (13). This is formally stated in the derivative below:

$$\left.\frac{\partial g_n}{\partial E}\right|_{\dot{g}_n=0} = -\frac{\partial g/\partial E}{\frac{\partial g}{\partial g_n}-1} = \frac{\partial g/\partial E}{\left[1-\frac{\mu(1+m)(\beta+\alpha\psi)}{1+\mu(1+m)(\beta+\alpha\psi)}\right]} = [1+\mu(1+m)(\beta+\alpha\psi)]\left(\frac{\partial g}{\partial E}\right) > 0$$

With $\frac{\partial g}{\partial E} > 0$.

Accordingly, the locus for constant values of g_n will move up.

On the other hand, whilst improving growth performances help by themselves public budget solidity, restored financial market tranquility will reduce the interest rate i_L perhaps cutting the mark-up rate m. Consequently, the ($\dot{d} = 0$) locus will shift downward:

$$\left.\frac{\partial g_n}{\partial E}\right|_{\dot{d}=0} = -\frac{[(\partial i_L/\partial E)-(\partial g/\partial E))]}{-(\partial g/\partial g_n)} = \frac{1+\mu(1+m)(\beta+\alpha\psi)}{\mu(1+m)(\beta+\alpha\psi)}[(\partial i_L/\partial E)-(\partial g/\partial E))] \ <0$$

With $\frac{\partial i_L}{\partial E} > 0$

Should a EU member State be in serious troubles, as represented by point C in figure 7 below, such measures, if strong enough, may transform an apparently inexorably derive towards economic stagnation and public debt default into a sustained process of economic recovery and public debt stabilization. The economic system will move from point C to point D.

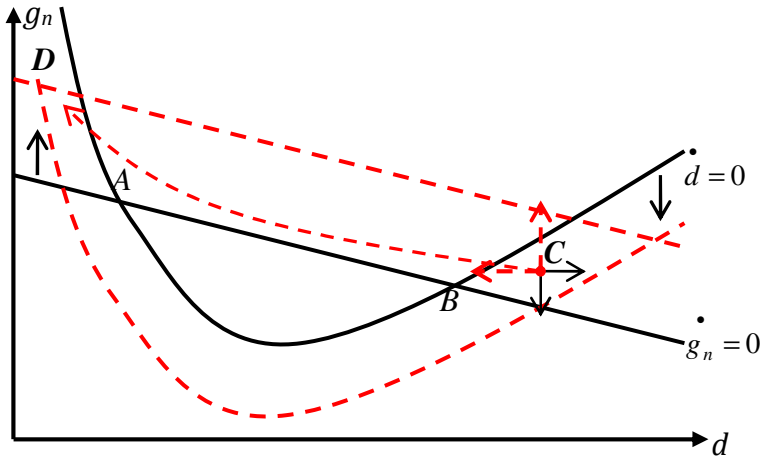

Figure 7 – Possible macroeconomic consequences of Eurobond issuances

In this sense, it is interesting to note that the initial intervention of EU institutions also creates the basis for its own long-term sustainability. Indeed, the improved solidity of member states own public debts, here represented by the shift from point C to point D, allow them to easily meet the joint commitment they assume when issuing the new Eurobond instrument. This point is fundamental. Actually, existing resistances against the introduction of Eurobonds stress that they will create heavy moral hazard problems and disincentive to run virtuous fiscal policies[15]. According to these critiques, irresponsible countries may be easily persuaded to run lack fiscal policies and weak public debt controls in the belief that the ensuing fiscal imbalances might be corrected by sharing the burden of adjustments with more righteous EU member states. This argument has obviously some ground and it is to consider carefully when elaborating the institutional and regulatory framework that will discipline future Eurobond practices. Nevertheless, our analysis tends to demonstrate that it may lose relevance on a macroeconomic level. With all the above caveats in mind and opportunely embodied in the Eurobond regulatory regime, such a deeper EU fiscal integration may strengthen EU member states fiscal stability rather than create perverse incentive towards fiscal profligacy and irresponsibility. In a way, the creation of a "European safety net", here the Eurobond initiative, against member states financial troubles may give rise to a self-sustaining virtuous process and autonomously eliminate the fear for global instability. The European community intervention, provided that some eligibility requirements are met so as to avoid potentially disruptive moral hazard problems, may underpin economic dynamics and fiscal soundness of member states, which in turn reduce future risks of new EU-funded rescue packages.

[15] See Issing (2009) on such a standpoint.

5. Conclusions

There is no doubt that the economic scenario several economies currently deal with is the worst possible since the 1929 Great Depression. Economic activity has barely recovered from the 2007 sub-prime meltdown and it is now dramatically jeopardized by mounting financial tensions about sovereign debt sustainability. In particular, several EU member states are now dangerously swaying between the need of fiscal stimuli to support economic activity and severe fiscal corrections to ensure financial markets on their own public account solidity. Problems are so deep as to threaten the existence of the European Monetary Union. A credible and immediate way-out does not seem to resolve such an impasse.

In this paper we address these hot issues through a formal post-Keynesian model. Our work heavily hinges on some previous post-Keynesian contributions, two papers from Lavoie (2006) and Fontana and Setterfield (2009) in particular. Compared to them, here we go a step further by analyzing in a dynamic context, in which financial markets beliefs may suddenly change, how financial variables, i.e. credit supply and asset prices, endogenously interact each other and affect real economy activity. This way, we try to provide a simple, perhaps rough but intuitive formal description of the Minskyan financial instability hypothesis. Moreover, we also show why public intervention in the aftermath of the 2007 crisis has been largely useless to restore financial tranquility and it has transformed a prevalently private debt crisis into a public debt one.

We conclude our analysis with a look at the long-run. We stress that, in the present context, the above financial instability may produce long-lasting economic "dramas" such as permanent drops in growth potential and public debt default. To avoid this awful events to take place, a deep institutional discontinuity is probably needed. One possibility at hand, at least in the Euro-zone, is the introduction of Eurobonds through which member states mutually help each others in case of deep financial and economic difficulties.

The proposal is obviously controversial and presents lights and shadows. Doubts concern moral hazards Eurobond issuances may create by inducing countries to forget fiscal discipline and share ensuing bail-out costs with other more virtuous member states. In this sense, critics argue, the Stability and Growth Treaty (SG) would be irremediably violated by not respecting the no-bail-out clause. Furthermore, the Euro-zone would definitely lose its credibility as a stable and sound economic area and its political legitimacy weakened[16].

Even though these points must be carefully considered, we believe that Eurobonds may constitute a decisive step forward a full European economic and political entity. Actually, it is to recognize that a EU member country default does not represent a national event any longer, but it will entail communitywide negative spill-over at the financial and real-economy level. Such an event, that someone would justify and permit by blindly recalling the need to respect existing rules, may eventually trigger global consequences much worse that the costs of a EU-funded assistance initiative. Beside this, also remember that, except of Greece, the ongoing crisis is largely due to the 2007 financial meltdown and the ensuing financial system

[16] According to Kosters (2009): "how could the German government explain to its citizens that they have to pay for the mismanagement of the governments of other EMU countries contrary to the treaties? How will the spending of that money be democratically controlled? Bilaterally or by a European institution? (…) the danger of quarrels leading to political tensions is large (Kosters, 2009, p. 137)".

rescue packages approved in several EU countries, not to fiscal profligacy. Ireland and Spain, for instance, were considered virtuous countries running fiscal surpluses and reducing their debt-to-GDP ratios before 2007 (De Grauwe, 2011b). Now they are in the eye of the storm: a common European response to such unforeseen possibility is to consider.

In this paper, we do not address all these topics. Rather, we simply try to show that EU help through Eurobond issuances may actually improve the macroeconomic solidity of single EU members and of the whole EU area. In case of deep financial and economic crisis, Eurobonds may provide member states with the resources required to implement long-run oriented expansionary fiscal policies. While this possibility, by itself, will represent demand injections supporting economic growth and public balance management, it may also calm financial markets and restore their normal functioning. We think these possible macroeconomic outcomes of Eurobond issuances must be seriously taken into account more than any formal adequacy to existing rules.

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