Working Paper No. 740

Conflicting Claims in the Eurozone? Austerity's Myopic Logic and the Need for a European Federal Union in a Post-Keynesian Eurozone Center–Periphery Model

by

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December 2012

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ABSTRACT

In this paper, we analyze the role of the current institutional setup of the eurozone in fostering the ongoing peripheral euro countries' sovereign debt crisis. In line with Modern Money Theory, we stress that the lack of a federal European government running anticyclical fiscal policy, the loss of euro member-states' monetary sovereignty, and the lack of a lender-of-last-resort central bank have significantly contributed to the generation, amplification, and protraction of the present crisis. In particular, we present a Post-Keynesian eurozone center–periphery model through which we show how, due to the incomplete nature of eurozone institutions with respect to a full-fledged federal union, diverging trends and conflicting claims have emerged between central and peripheral euro countries in the aftermath of the 2007–08 financial meltdown. We emphasize two points. (1) Diverging trends and conflicting claims among euro countries may represent decisive obstacles to the reform of the eurozone toward a complete federal entity. However, they may prove to be self-defeating in the long run should financial turbulences seriously deepen in large peripheral countries. (2) Austerity packages alone do not address the core problems of the eurozone. These packages would make sense only if they were included in a much wider reform agenda whose final purpose was the creation of a government banker and a federal European government that could run expansionary fiscal stances. In this sense, the unlimited bond-buying program recently launched by the European Central Bank is interpreted as a positive, albeit mild step in the right direction out of the extreme monetarism that has thus far shaped eurozone institutions.

Keywords: Eurozone Debt Crisis; Modern Money Theory; Post-Keynesian Center–Periphery Model

JEL Classifications: E02, E12, H63

1. CONFLICTING INTERESTS IN THE EUROZONE?

From mid-2010 on, most economists have devoted an increasing amount of effort to explain the causes of the current eurozone crisis, and different opinions have emerged. Some economists identify European Union (EU) member states' fiscal profligacy as the root of the crisis (Kosters 2009; Panetta 2011; Weidmann 2012; ECB 2012). Others stress the existence of a balance-of-payments problem among eurozone countries (Hein, Truger, and van Treek 2011; Perez-Caldentey and Vernengo 2012; Bibow 2012). Others, finally, emphasize that the eurozone is not an optimal currency area, and that the existing crisis is nothing but the consequence of the eurozone's difficulties dealing with asymmetric shocks (Krugman 2012).

Inside this debate, a transversal strand of thought describes the crisis of peripheral euro economies as closely similar to the crises faced by several developing countries in the decades after 1982 (De Grauwe 2011; Soros 2012). According to this perspective, the creation of the monetary union has induced the increase of financial flows inside Europe. Once the exchange rate risk usually associated with allegedly unreliable southern European countries was eliminated, capital was massively directed toward them (Waysand, Ross, and de Guzman 2010; Perez-Caldentey and Vernengo 2012; Lin and Treichel 2012). Accordingly, interest rate differentials—with respect to central economies—have mostly disappeared. Center–periphery convergence has appeared.

The 2007–08 financial meltdown abruptly changed this picture. Economic recession has affected all EU member states. Economic downturns, however, have been particularly severe in Spain and Ireland. Their national governments, which had until that point demonstrated examples of rigorous fiscal discipline, have had to bail out financial institutions and provide relief from mounting unemployment. Spanish and Irish fiscal deficits and public debts have soared. In the case of Greece (and partially Italy), the problems connected to high public debt stocks have started to distress financial markets. Into this framework, capitals have suddenly changed direction, selling the periphery's risky bonds in search of the center's treasury bills. Center–periphery convergence has opened the stage to widening diversities. Interest rates have drastically increased in the periphery and economic activity has plummeted compared to the weak but positive performance of central economies.

Given this dismal scenario, what is the way out? The answer to this question depends mostly on the analysis of the causes of the crisis. In line with the idea that the crisis is a

consequence of past irresponsible fiscal policies, most international institutions identify fiscal consolidation as the only solution to the eurozone's problems. Debtor countries must pay their debts. To do so, they have to implement tough austerity packages. To facilitate this task, peripheral economies also have to launch structural reform programs. The privatization of inefficient public enterprises, the downsizing of public bureaucracy, and the liberalization of goods and labor markets are the measures suggested to increase the efficiency of the overall economic system and instigate growth. In this view, there isn't any role for demand-side factors to play.

Several economists stress that productivity gaps and unit labor cost divergence are relevant causes of external account imbalances between central and peripheral euro countries (De Grauwe 2012). While these disequilibria are somehow consequences of the process of monetary unification and financial integration, their solutions seem to be hindered by the existence of the common euro currency itself. Actually, in front of deep recessions, an exchange rate devaluation could help peripheral economies to re-instigate growth and to rebalance external disequilibria. The loss of monetary sovereignty, however, put further strain on their adjustment process. It is based on these arguments that an increasing number of experts, financial commentators, and policymakers indicate the perhaps temporary exit of some euro countries from the monetary union as the best, although costly, solution to the existing crisis (Roubini 2011; Allen and Ngai 2012; Miller and Skidelsky 2012; Posner 2012).

In this paper, we adopt an alternative perspective on the leading factors behind the eurozone crisis and on the most promising way to solve it. Following Kregel (2012), peripheral euro countries are facing a severe sovereign debt crisis due to their incapability to easily access financial markets and refinance outstanding debts. Are such difficulties due to irresponsible fiscal policies? This could be the case for Greece, but not for Spain and Ireland, so fiscal profligacy cannot be identified as the in-depth source of eurozone problems (De Grauwe 2010). Actually, the current eurozone crisis seems to have been decisively aided by the original institutional setup of the eurozone and its *incomplete* nature with respect to a fully developed federal union. First, in the present European Monetary Union (EMU), eurozone countries are in the same position as the United States is, except that they lack any federal institution to help them in the event of severe economic downturns. Second, euro countries use the same currency and issue debt in a currency they do not control, so they no longer have monetary sovereignty. The EMU now works "much like a US which operated with a FED, but with only individual

state treasuries. It will be as if each EMU member country were to attempt to operate fiscal policy in a foreign currency; deficit spending will require borrowing in that foreign currency according to the dictates of private markets" (Wray 1998, pp. 91–92).

According to Modern Monetary Theory (MMT), such an institutional framework seriously exposes member states to default (Papadimitriou and Wray 2012), hence the financial turbulences—which would hardly take place in monetary sovereign economies (De Grauwe 2011). More generally, all the above lacking elements in the original design of the EMU tend to create diverging trends and conflicting interests among eurozone countries in the presence of *common* (and not asymmetric), although with different intensity, adverse economic shocks. Since the outbreak of the 2007–08 financial crisis, eurozone peripheral economies have been suffering protracted financial instability, while central economies—regardless of their effective financial solidity—are benefitting from never-before-seen low interest rates. Furthermore, while the former are entangled in inexhaustible campaigns to implement austerity packages, the latter can safely pursue fiscal stabilization thanks to close-to-zero (or even negative) real interest rates. Finally, while peripheral economies likely need some expansionary or perhaps inflationist monetary policy by the European Central Bank (ECB) and fiscal support from European institutions, central countries call for rigorous anti-inflationist monetary/fiscal policies to preserve their external competitiveness and their mercantilist-type export-led growth pattern.

It is easy to see how such differences might persuade economists and national policymakers from central economies that peripheral countries must solve existing problems on their own. Furthermore, the above divergences can work to delay any serious attempt at ending the present crisis with a reformation of European institutions in the direction of a federal European fiscal union with a true lender-of-last-resort central bank. Nevertheless, reforming European institutions toward the creation of a complete monetarily sovereign federal union is probably the decisive step ahead in solving the eurozone crisis. Accordingly, all the euro-skeptic feelings that take strength from the above divergences likely represent the worst threat to the survival of the euro project, and may prove to be dramatically wrong in the event of a collapse of the EMU.

In the following sections, we formally address this point through a eurozone center–periphery model. In doing so, we will distinguish between a big center–*small* periphery framework and a big center–*big* periphery framework.

2. THE MODEL

Consider two countries: a well-developed center and a relatively less-developed periphery. They share the same currency and have delegated monetary policy to a common central bank. Despite these common elements, the two countries maintain complete fiscal independence concerning anti-cyclical measures and welfare policies. Fiscal deficits are financed by issuing national treasury bonds denominated in the same euro currency. According to the current eurozone framework, there is no federal fiscal authority that imposes taxes, makes expenditures, or collects financial resources by issuing federal government bills.

Following Lavoie (2006), equations (1) and (2) define the growth rates of the center and the periphery as a function of autonomous demand injections:

$$g_C = f_C\left(G_C, EX_C, I_C\left(P_C^T\big(i_C(\sigma_C)\big), P_P^T\big(i_P(\sigma_P)\big)\right)\right) \text{ }^1 \tag{1}$$

$$g_P = f_P\left(G_P, EX_P, I_P\left(P_P^T\big(i_P(\sigma_P)\big), P_C^T\big(i_C(\sigma_C)\big)\right)\right) \tag{2}$$

Equation (1) tells us that the current economic performance of the center's economy (g_C) positively depends on the current domestic government expenditures (G_C), current net exports (EX_C), and total investment (I_C).

According to the endogenous monetary theory, investment does not come from savings. On the one hand, investment depends on entrepreneurs' animalistic spirits. On the other hand, investment is affected by banks' credit policies, which define the *effective* demand for credit based on the soundness of banks' assets. Accordingly, equation (1) assumes that economic growth in the center is indirectly affected by the price of the center government's bonds (P_C^T), which, in turn, depends negatively on interest rate i_C. Changing prices of the center government's bonds will alter the solidity of banks' balance sheets and therefore their credit policy. Investment demand will inevitably be affected by easing or, as is currently occurring, tightening conditions on the credit market. Equation (1) emphasizes that the periphery government's bonds may also influence banks' credit policy in the center. Indeed, before the outbreak of the crisis, central economy banks largely provided loans to peripheral economies.

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[1] In a more realistic discrete time model, we define current output (Y_t) as: $Y_t = m(I_t + G_t + EX_t)$. "$m$" stands for the Keynesian multiplier. Noting that $Y_t = Y_{t-1}(1 + g_t)$, we can write the growth rate of real GDP at time t as: $g_t = m(\eta_I g_t^I + \eta_G g_t^G + \eta_{EX} g_t^{EX})$. In our formulation, g_t^I, g_t^G, and g_t^{EX} are the growth rates of total investment (I), public expenditures (G), and economy's exports (EX); η_I, η_G, and η_{EX} are the corresponding shares of GDP. Ceteris paribus, the higher I_t, G_t, and/or EX_t, the better the growth performance of the economy as a whole.

They are now exposed to the risk of default in the periphery. This event may have significant effects on the functioning of the credit market in central euro countries, in particular in the event of financial turmoil in big peripheral economies.[2]

Equation (2) gives us the GDP growth rate in the periphery. Its economic meaning is exactly equivalent to that of equation (1). According to international financial data, peripheral euro countries are net receivers of foreign capital, in particular from central euro countries, and net debtors on international financial markets. Yet, according to Waysand, Ross, and de Guzman (2010), big peripheral economies such as Spain and Italy have also accumulated significant asset positions in the center. In light of these facts, in equation (2), we assume both peripheral and central bonds to be in the balance sheets of peripheral banks and therefore to influence, via banks' credit policy, domestic investment I_P.

In equations (1) and (2), interest rates i_C and i_P are influenced by parameters σ_C and σ_P, respectively. In our model, they stand for country-specific risk indicators that financial operators assign to assets issued by eurozone countries. Parameter σ_C represents the risk perceived by financial markets in acquiring a central economy government's bonds. Parameter σ_P, instead, grasps all the country-specific factors taken into account by financial investors when buying a peripheral government's bonds. Such country-specific factors influence the remuneration gained on bonds' holdings. In particular, they determine the spread between the interest rate $i_C (i_P)$ of the central (peripheral) economy government's bonds and the interest rate i^* associated to, say, a third-country's riskless financial asset, such as US government Treasury bills. This point is modeled in equations (3) and (4):[3]

$$i_C = i^* + \sigma_C \tag{3}$$

$$i_P = i^* + \sigma_P \tag{4}$$

In this paper, we model inflation at country level in a standard accelerationist fashion:

$$\pi_C = \pi^T + \psi(g_C - g_C^n) \tag{5}$$

$$\pi_P = \pi^T + \chi(g_P - g_P^n) \tag{6}$$

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[2] In equation (1), P_P^T stands for the market price of the periphery government's bonds and i_P is the connected interest rate.

[3] For the sake of simplicity, we neglect the euro-dollar exchange rate risk in equations (3) and (4). We do this in order to stress the relevance of financial transactions among different euro countries' bonds instead of capital flights from eurozone assets toward third-countries' financial activities. In this sense, it is worth noting the fairly small devaluation of the euro with respect to the Dollar, in spite of the considerable distress afflicting European financial markets since 2010.

Equation (5) tells us that the current inflation in the center country π_C is equal to the inflation target π^T established by the ECB in the event that current growth g_C is equal to the central economy's full-employment growth rate g_C^{n4}. Should g_C be higher (lower) than g_C^n, inflation in the center will be higher (lower) than the long-run average inflation rate pursued by European monetary authorities. The same line of reasoning applies to equation (6), which gives us current inflation in the periphery π_P. In equation (6), g_P^n stands for potential growth in the periphery. Parameters ψ and χ represent the sensitivity of inflation dynamics to the output gap in the center and the periphery, respectively.

Once g_C, g_P, i_C, i_P, π_C and π_P in equations (1)–(6) are defined, the dynamic side of the model is encapsulated in equations (7)–(10). In line with the aim of this paper, here we focus on financial variables such as debt-to-GDP ratio and country-specific risk factors. Equations (7) and (8) give us the dynamics of the debt-to-GDP ratio d_C^5 and of the country-specific risk indicator σ_C in the center:

$$\dot{d}_C = d_C\big(\widehat{D_C} - \pi_C - g_C\big) = d_C\left[\frac{\Omega_C(d_C)}{d_C} + i_C - \pi^T - (1+\psi)g_C + \psi g_C^n\right] \tag{7}$$

$$\dot{\sigma}_C = \beta\big(d_C - \overline{d_C}(d_C^*(\sigma_C), \varepsilon_P)\big) \tag{8}$$

With $\overline{d_C} = d_C^*$ if $\varepsilon_P = 0$; $\overline{d_C} > d_C^*$ if $\varepsilon_P > 0$

Equation (7) reads that the time derivative of the central economy's debt-to-GDP ratio $\dot{d}_C$ is a positive function of the primary deficit-to-GDP ratio $\Omega_C(d_C)$. In this model, we assume Ω_C to be a negative function of the debt-to-GDP ratio d_C. Actually, perhaps influenced by the apparently worldwide run against public debt, the higher d_C, the stronger the political pressures to squeeze primary deficits—hence the negative relationship between Ω_C and d_C. Public debt-to-GDP dynamics in the center is positively affected by the interest rate i_C. The higher i_C is, the higher the service costs of outstanding debt and therefore new debt issuances.

In equation (7), the inflation target π^T, set by the ECB, has a negative impact on the dynamics of the central economy's debt-to-GDP ratio. Ceteris paribus, the higher π^T is, the higher the inflation rate in the center and therefore its nominal GDP. Stabilization or reduction of the debt-to-GDP ratio would likely follow. Current growth rate g_C shows a similarly negative

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[4] We define g^n as the growth rate of real GDP consistent with the full utilization of available resources, labor in particular, and given the growth rate of labor productivity. For more details on this point, see León-Ledesma and Thirwall (2002) and Lavoie (2006).

[5] d_C is defined as $D_C/P_C Y_C$. D_C stands for the stock of public debt in the center, P_C is the overall economy price level, and Y_C is the central economy's real GDP. In equation (7), $\widehat{D_C}$ is the percentage variation in the central economy's debt stock.

effect on d_C. Finally, the evolution of the debt-to-GDP ratio in the center is influenced positively by the potential growth rate g_C^n. Ceteris paribus, the higher g_C^n and the connected output gap, the lower domestic inflation will be—or, even worse, the higher the risk of deflation will be. A Fisher-type debt-deflation process could take place, destabilizing the debt-to-GDP ratio.

Equation (8) tries to model how financial operators may periodically update the financial risk indicator attached to the center. We assume the central economy's risk indicator to be revised by confronting the outstanding debt-to-GDP ratio d_C with some benchmark level $\overline{d_C}$. According to equation (8), should d_C be higher (lower) than the benchmark level $\overline{d_C}$, financial operators will increase (reduce) the financial risk indicator σ_C, so that $\dot{\sigma}_C > 0$ ($\dot{\sigma}_C < 0$). Parameter β stands for the sensitivity of financial operators' feelings to any gap between current debt-to-GDP ratio and the benchmark level $\overline{d_C}$.

As to debt-to-GDP target $\overline{d_C}$, in this model we assume $\overline{d_C}$ to depend positively on two factors: d_C^* and ε_P. First, d_C^* stands for the equilibrium level of the debt-to-GDP ratio consistent with the economy growing at full potential. The other way around, d_C^* represents a sort of long-run equilibrium level of the debt-to-GDP ratio once the economy has achieved its potential growth rate g_C^n and, consequently, primary deficit (or surplus) is at its structural level. The full-employment debt-to-GDP ratio may be defined according to the expression below:

$$d_C^* = \frac{\Omega_C^*}{(g_C^n + \pi^T - i^* - \sigma_C)}$$

Where Ω_C^* is the primary deficit-to-GDP ratio at its structural level.

In times of financial stability, without bad news from the center and from the periphery (i.e., $\varepsilon_P=0$), we assume financial operators to set the benchmark level $\overline{d_C}$ equal to the full-employment debt-to-GDP ratio d_C^*. Financial operators will thus upwardly revise the risk indicator σ_C only in the event that current debt-to-GDP ratio in the center should be higher that its long-run expected value d_C^*.

The most recent experience tells us that financial operators do not take into account only domestic factors to evaluate financial risk in the center. In times of financial distress, external factors may take on a leading role, as well. Actually, the eurozone crisis clearly affirms that bad news from the periphery can strongly influence investment portfolio decisions and induce capital to suddenly leave the periphery in search of a safe haven in the center. Such capital flights can often be seen as irrational and de-linked from the effective financial solidity of

allegedly safe central euro countries.[6] Nonetheless, they are at the basis of the surge in interest rate spreads between central government bonds and peripheral treasury bills. In equation (8), the term ε_P aims to illustrate this point. In particular, if we imagine some bad news coming from the periphery (e.g., a deeper economic recession than elsewhere or low space for anti-cyclical policies due to already high debt-to-GDP ratios), the term ε_P will assume positive values. This will lead financial operators to increase the benchmark level $\overline{d_C}$. Regardless of the effective gap between d_C and d_C^*, financial markets will move capital away from the periphery and toward the center, possibly reducing the financial risk factor σ_C associated with the central economy's bonds.

Equations (9) and (10) correspond to equations (7) and (8), and now refer to the periphery:

$$\dot{d}_P = d_P\big(\widehat{D_P} - \pi_P - g_P\big) = d_P\left[\frac{\Omega_P(d_P)}{d_P} + i_P - \pi^T - (1+\chi)g_P + \psi g_P^n\right] \tag{9}$$

$$\dot{\sigma}_P = \delta\big(d_P - \overline{d_P}(d_P^*(\sigma_P), \varepsilon_P)\big) \tag{10}$$

With $\overline{d_P} = d_P^*$ if $\varepsilon_P = 0$; $\overline{d_P} < d_P^*$ if $\varepsilon_P > 0$

Equations (9) and (10) describe the dynamics of the debt-to-GDP ratio d_P and of the country risk factor σ_P in the periphery along similar lines as those assumed in the center. Note, however, a fundamental asymmetry with respect to financial risk dynamics in the center. Actually, adverse shocks hitting peripheral economies (i.e., $\varepsilon_P > 0$) will be immediately passed through a value of $\overline{d_P}$ lower than d_P^*. Accordingly, huge capital outflows will occur and the peripheral economy's financial risk indicator σ_P will be revised upward.

Equations (7)–(8) and (9)–(10), if considered all together, give rise to a highly complex four-equation dynamic system, whose stability should be assessed by considering all possible real-side and financial links between central and peripheral countries. In order to keep the analysis of the model as simple as possible, for the time being we prefer to consider the sets of equations (7)–(8) and (9)–(10) as independent. In particular, we now assume equations (7)–(8) and (9)–(10) to be somehow connected only by the asymmetric response of financial markets to bad news in the periphery—i.e., factor ε_P in equations (8) and (10). Actually, we will return to the fully extended four-by-four dynamic system later on, when analyzing center–periphery dynamics in the case of a large and economically influential peripheral economy. Moreover, we

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[6] According to data from the International Monetary Fund (IMF), in 2011, the Spanish debt-to-GDP ratio was equal to 68.5 percent. It was much lower than the same data for Belgium, Germany, or even the UK, and very close to the value associated to Netherland (IMF 2012).

now focus on the central economy's dynamic system only,[7] and analyze the connected Jacobian matrix J_C (evaluated at the steady state). We get:

$$J_C = \begin{bmatrix} \frac{\partial \dot{d}_C}{\partial d_C} & \frac{\partial \dot{d}_C}{\partial \sigma_C} \\ \frac{\partial \dot{\sigma}_C}{\partial d_C} & \frac{\partial \dot{\sigma}_C}{\partial \sigma_C} \end{bmatrix} = \begin{bmatrix} d_C \left[\dfrac{\left(\frac{\partial \Omega_C}{\partial d_C}\right) d_C - \Omega_C}{d_C^2} - (1+\psi)\frac{\partial g_C}{\partial d_C} \right] & -d_C(1+\psi)\frac{\partial g_C}{\partial \sigma_C} \\ -/+ & + \\ \beta & -\beta \frac{\partial \overline{d_C}}{\partial d_C^*}\frac{\partial d_C^*}{\partial \sigma_C} \\ + & - \end{bmatrix}$$

As to the partial derivative $\left(\partial \dot{d}_C / \partial d_C\right)$, its sign is likely to be negative for low values of the debt-to-GDP ratio d_C. In this case, a slight increase in d_C may induce policymakers to cut primary deficit Ω_C. At the same time, a slightly higher value of d_C would probably have no effect on current growth (i.e., $\frac{\partial g_C}{\partial d_C} = 0$). Things may radically change at much higher values of the debt-to-GDP ratio. First, when d_C is too high, reductions in primary deficits may prove to be too small and insufficient to stabilize public debt dynamics. Second, perhaps in the presence of widespread fear about public debt sustainability, economic performance may deteriorate and growth may decline, so that $\frac{\partial g_C}{\partial d_C} < 0$. Unstable dynamics may thus emerge, possibly leading to an out-of-control increase in debt-to-GDP ratios.

As to derivatives $(\frac{\partial d_C}{\partial \sigma_C})$ and $(\frac{\partial \dot{\sigma}_C}{\partial d_C})$, there are no doubts about their positive signs. In particular, a higher financial risk σ_C will complicate public debt management, given that it will increase debt service costs and hamper current economic growth through the interest rate–investment nexus.

In the Jacobian matrix above, the partial derivative $(\frac{\partial \dot{\sigma}_C}{\partial \sigma_C})$ will have a negative sign. Ceteris paribus, an increase in the risk factor σ_C will raise the long-run full-employment value of the debt-to-GDP ratio d_C^*, which in turn will induce a downward revision of σ_C. In a way, we may interpret this point as a self-stabilizing force in the dynamics of country risk factors. The higher σ_C, the more difficult it will be to newly increase the next time.

Graphically, the dynamic system above and the set of equations describing how a central economy works (the same applies to the periphery) can be represented through the four-panel


Figure 1 below. The top-right panel portrays the two loci for constant values of the debt-to-GDP ratio d_C and the country risk factor σ_C. The $(\dot{d}_C = 0)$ locus is represented by an inverted U-shaped curve. The $(\dot{\sigma}_C = 0)$ locus is an upward sloping curve with a horizontal asymptote when $\overline{d_C} = d_C^* = \frac{\Omega_C^*}{(g_C^n + \pi^T - i^* - \sigma_C)} = \infty$. Furthermore, we assume it to have a horizontal segment, with $\sigma_C = 0$, when d_C is lower than $d_{C(\sigma_C=0)}^* = \frac{\Omega_C^*}{(g_C^n + \pi^T - i^*)}$. Note two intersection points, hence the possibility for multiple equilibria to exist. Equilibrium *A* features a lower debt-to-GDP ratio d_C^1, a lower country-specific risk indicator σ_C^1 and a higher growth rate g_C^1 than the records associated with equilibrium *B*. Furthermore, while point *A* shows a stable dynamic in its neighborhoods, equilibrium *B* is unstable. In our mind, equilibrium *B* represents a sort of risky economic environment, the pre-crisis Greek context for instance, in which a temporary economic shock may well be enough to generate explosive dynamics in the debt-to-GDP ratio. For the sake of simplicity, in Figure 1 we do not explicitly introduce any upper bound to the evolution of d_C. Such a ceiling is, however, a concrete possibility in the case of euro member countries, given the present European institutional framework.[8] It thus makes sense to believe that a destabilizing right-to-left dynamic in Figure 1 cannot continue indefinitely and that an upper limit will eventually bind, beyond which public debt will no longer be rolled over and default will take place.

Moving counter-clockwise in Figure 1, the remaining panels describe the economic mechanisms connecting d_C to g_C. In the top-left panel we depict equation (3), while in the bottom-left panel we depict equation (1). In the bottom-right panel we explicitly match debt-to-GDP ratios and GDP growth rates associated to the long-run equilibria reported in the top-right quadrant.

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[8] The apparently endless increase in Japan's debt-to-GDP ratio may confirm that "Sovereigns do not default" (Kregel 2012). However, we all know how far euro countries are from being fully sovereign states in the present eurozone framework.

Figure 1 The case for multiple long-run equilibria
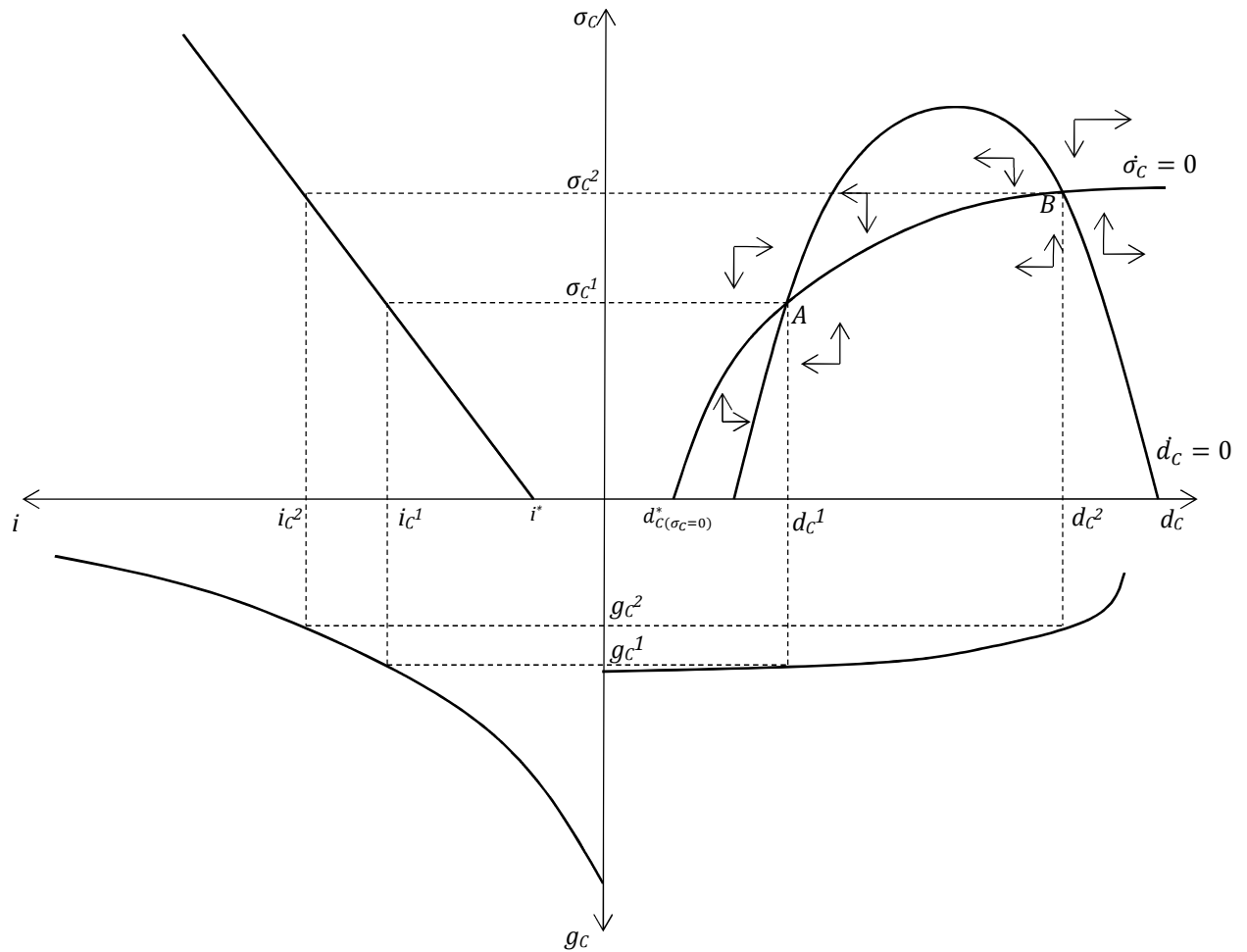
3. CENTER–PERIPHERY DIVERGENCE IN THE AFTERMATH OF THE 2007–08 FINANCIAL MELTDOWN

Equations (7)–(8) and (9)–(10) describe debt-to-GDP ratios and country-specific risk factors to follow broadly similar adjustment rules in the center and in the periphery. Yet, important asymmetries exist in the way the two countries can face common economic shocks. We have already discussed the role of the factor ε_P in equations (8) and (10). Some more points are worth stressing here.

First, remarkable economic performances in most peripheral euro countries in the first half of the 2000s were largely fed by mounting housing bubbles. Since 2007, the housing sector has been in the eye of the storm. On the one hand, this has implied longer and sometimes deeper economic downturns in peripheral countries than elsewhere. On the other hand, peripheral

governments have had to massively intervene to avoid the collapse of the financial system and provide safety nets against widespread unemployment, with the ensuing higher-than-abroad burden on public finances.

Second, several peripheral countries still present relatively underdeveloped productive systems—at least with respect to the center. This is clear in the cases of Greece and Portugal. Furthermore, these economies are poorly integrated on international markets and show a low propensity to export. This fact can be interpreted as a sign of the lack of competitiveness of their productive patterns and provides an explanation for their difficulties in reinstigating growth quickly by exploiting world recovery.

Third, peripheral and central euro countries show opposite positions on international financial markets. Since the beginning of the 2000s, peripheral euro countries have recorded significant balance-of-payments current account deficits and increasing net external debt stocks. On the contrary, most central euro countries have registered large trade and current account surpluses. By the end of 2010, their foreign assets far outstripped foreign liabilities. As a consequence of these facts, peripheral countries are now highly exposed to capital flights and sudden stops, which can easily trigger liquidity and insolvency crises. This is particularly true inside the EMU, in which liquidity can safely dry up in the periphery and move to the center without bearing any exchange rate risk. Central euro countries, on the contrary, appear as safe havens to financial investors, and their financial markets have plenty of liquidity with positive consequences in terms of financial stimuli for economic recovery.

Let's try to see more formally the long-run consequences of such asymmetries both in a big center–*small* periphery setting and in a big center–*big* periphery context in the aftermath of the 2007–08 financial meltdown.

3.1. The Big Center–*Small* Periphery Case

Imagine a large central economy—let's say Germany—and a *small* peripheral country—Greece or Portugal, for instance. On the basis of the above simplifications, imagine that economic links between the two countries are weak. First, the center's exports to the periphery amount to a negligible proportion of total central economy exports, so that we can assume $\left(\frac{\partial g_C}{\partial EX_C} \frac{\partial EX_C}{\partial EX_{C \to SP}} \right. =$

$0\big)$.[9] Even though the opposite might be true in the periphery in a general center–periphery model, inside the eurozone small peripheral countries do not have tight trade relationships with central economies. Accordingly, let's apply the above assumption in the case of the periphery, as well. Second, even though overall financial markets' response to bad news in the periphery and center–periphery capital flights can have significant economic consequences, imagine *direct reciprocal* center–periphery financial links to be negligible in the case of a small peripheral country. On the one hand, assume the center economy's foreign assets in the periphery not to have much weight in the center financial institutions' balance sheets, so that $\left(\frac{\partial g_C}{\partial I_C}\right)\left(\frac{\partial I_C}{\partial P_P^T}\right) = 0$[10]. On the other hand, apply this line of reasoning also to equation (2) and to the small periphery's asset holdings in the center. Accordingly, we assume $\left(\frac{\partial g_P}{\partial I_P}\right)\left(\frac{\partial I_P}{\partial P_C^T}\right) = 0$.

In this framework, assume that a common negative economic shock occurs, curtailing growth and increasing public deficits in both economies. However, economic downturn in the periphery is deeper and lasts longer compared to recession in the center. Moreover, peripheral public finances register deeper imbalances than abroad, and fiscal deficits skyrocket. In terms of a two-country version of Figure 1, such events induce both loci $\left(d_C = 0\right)$ and $\left(d_P = 0\right)$ in the center and in the periphery to move downward. However, the extent of these movements will be different. Deeper recession and wider public balance deficits in the periphery than in the center will move the locus for stable d_P values far further down than the corresponding locus for a constant debt-to-GDP ratio in the center will. We depict these facts in Figure 2. Figure 2a focuses on the periphery, while figure 2b plots changing dynamics in the center.

Stimulated by these same events, capital markets will not react neutrally to economic recessions and increasing debts in the periphery and in the center. Apparently worsening conditions in the periphery will suddenly induce capital to leave the country and give rise to a "run to quality." The center, perhaps due to its stronger capability to quickly restore growth, will provide the right assets to safely invest money in. In equations (8) and (19), the factor ε_P will

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[9] $EX_{C \to SP}$ stands for the exports of the center toward the *small* peripheral euro country.
[10] By September 2011, according to data from the Joint External Debt Hub (JEDH), more than 80 percent of French banks' foreign assets in peripheral euro countries were concentrated in Italy and Spain. In the case of German banks, their exposure in Italy and Spain amounted to 67 percent of overall German security holdings in peripheral euro member states (JEDH 2012). In light of this evidence, the above assumptions must be seen in a comparative perspective as a way to remark differences between a *soft* crisis scenario, in which small peripheral countries only risk default, and a much more worrisome crisis in which financial turbulences dramatically increase in big peripheral economies, as well.

assume a positive value and lead financial operators to revise country-specific risks. In the periphery, an upward revision of the factor σ_P will take place. Central economy bonds, on the contrary, will get higher ratings and the country-risk factor σ_C will decrease. Graphically speaking, asymmetric behaviors of financial markets are depicted through opposite movements in the loci for $(\dot{\sigma}_P = 0)$ and $(\dot{\sigma}_C = 0)$. In Figure 2a, the locus for constant values of σ_P will move to the left. In Figure 2b, the locus for $(\dot{\sigma}_C = 0)$ will shift to the right.

The final outcomes of these movements depend on their relative intensity. In Figure 2 we provide an extreme result, which nevertheless seems to reflect well the existing opposite dynamics between central and peripheral economies. In Figure 2a, higher public deficits, economic recession, and financial turbulences all induce substantial increases in the debt-to-GDP ratio d_P and in the risk indicator σ_P in the periphery. As a consequence of the initial temporary economic shock, the periphery seriously risks a permanent move from equilibrium A to the new equilibrium C, in which much higher interest rates will go hand-in-hand with far lower growth rates compared to the before-crisis period. Even worse, should the periphery be initially located in the unstable equilibrium B, as perhaps in the case of Greece, the above events could easily set in motion destabilizing dynamics and eventually lead the country to bankruptcy. Note that this could also happen in apparently safer countries, such as Spain and Ireland, in the event that financial markets' reactions to the crisis were so strong as to lead the two loci for $(\dot{\sigma}_P = 0)$ and $(\dot{d}_P = 0)$ to no longer intersect.

In the center, a radically different picture emerges. The crisis-driven downward movement in the locus for $(\dot{d}_C = 0)$ can induce the debt-to-GDP ratio to increase. However, financial markets' reactions to the crisis in the periphery and the ensuing capital flights to the center may tame such a trend. Actually, a slightly increasing debt-to-GDP ratio may paradoxically combine with a lower country risk factor, easing conditions on credit markets and causing growth to rebound. Should the reactions of financial markets be sufficiently strong, the debt-to-GDP ratio may even decrease along with a country risk factor close to zero. This is depicted in Figure 2b. It may resemble well what is occurring in a large central euro country such as Germany. Actually, thanks to never-before-seen low interest rates and considerable economic recovery in 2010 and 2011, the German debt-to-GDP ratio has begun to decrease since 2010 and it is expected to decrease further in 2012.

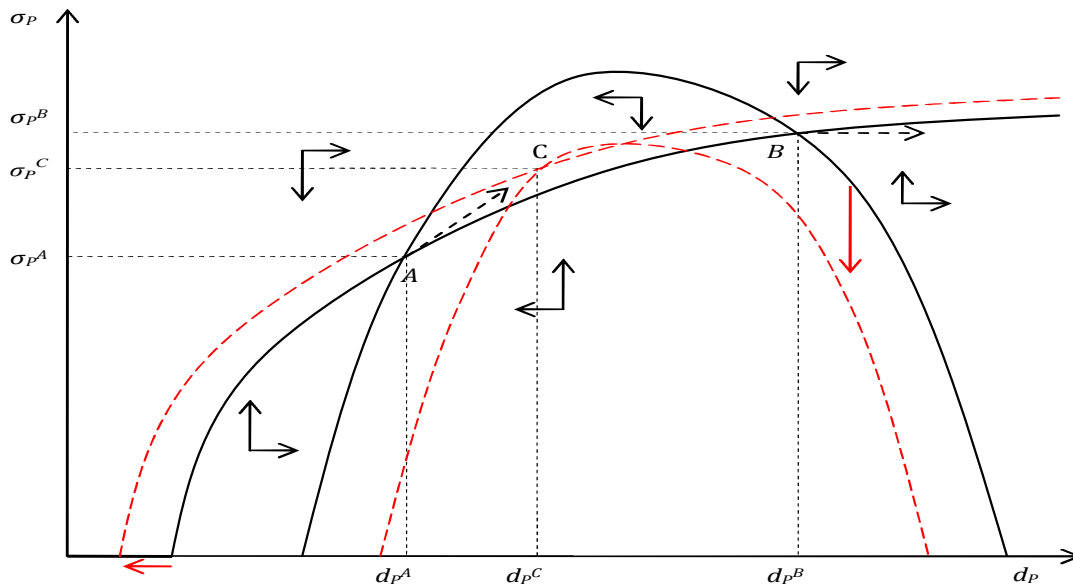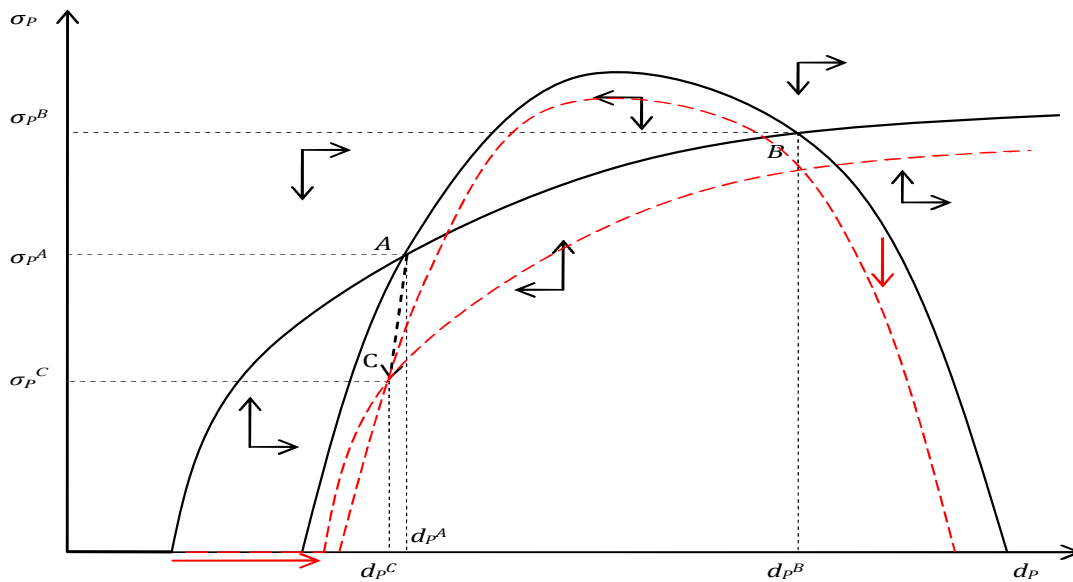*Figure 2a* Long-run dynamics in the periphery in the aftermath of the 2007–08 financial meltdown

Figure 2b Long-run dynamics in the center in the aftermath of the 2007–08 financial meltdown

3.2. The Big Center–*Big* Periphery Case

Things radically change and become much more complex when we consider a *big* peripheral economy. First, trade relationships between a big center and a big periphery are likely stronger than in the case of a small periphery. Economic recession in Italy, for instance, will likely have significant negative effects on economic dynamics in Germany—both directly, via Germany–Italy trade relations, and indirectly (e.g., by influencing economic activity in a third country

trade partner, such as France). In terms of our model, this implies that $\left(\frac{\partial g_C}{\partial EX_C} \frac{\partial EX_C}{\partial EX_{C \to BP}} > 0\right)$ [11] and vice versa. Second, central economy asset holdings in big peripheral countries are much more substantial than those in small economies. It is thus difficult to believe that the center's financial system will be immune to a mounting crisis in the periphery. Actually, the intertwined financial structure of central euro countries and big peripheral economies would easily give rise to a perverse cycle between bankruptcies in the periphery and financial dislocation in the center. Accordingly, more stringent conditionalities on credit markets may jeopardize investment both in the center and in the periphery, so that $\left(\frac{\partial g_C}{\partial I_C}\right)\left(\frac{\partial I_C}{\partial P_P^T}\right) > 0$ and $\left(\frac{\partial g_P}{\partial I_P}\right)\left(\frac{\partial I_P}{\partial P_C^T}\right) > 0$.

In order to formally analyze center–periphery dynamics in the case of big economies, consider the fully extended dynamic system composed by equations (7)–(10) and assess its stability through the four-by-four Jacobian matrix $J_{C/BP}$.

$$J_{C/BP} = \begin{bmatrix} \frac{\partial \dot{d}_C}{\partial d_C} & \frac{\partial \dot{d}_C}{\partial \sigma_C} & \frac{\partial \dot{d}_C}{\partial d_P} & \frac{\partial \dot{d}_C}{\partial \sigma_P} \\ \frac{\partial \dot{\sigma}_C}{\partial d_C} & \frac{\partial \dot{\sigma}_C}{\partial \sigma_C} & \frac{\partial \dot{\sigma}_C}{\partial d_P} & \frac{\partial \dot{\sigma}_C}{\partial \sigma_P} \\ \frac{\partial \dot{d}_P}{\partial d_C} & \frac{\partial \dot{d}_P}{\partial \sigma_C} & \frac{\partial \dot{d}_P}{\partial d_P} & \frac{\partial \dot{d}_P}{\partial \sigma_P} \\ \frac{\partial \dot{\sigma}_P}{\partial d_C} & \frac{\partial \dot{\sigma}_P}{\partial \sigma_C} & \frac{\partial \dot{\sigma}_P}{\partial d_P} & \frac{\partial \dot{\sigma}_P}{\partial \sigma_P} \end{bmatrix}$$

The list of equations below explicitly states partial derivatives (evaluated at the steady state) contained in matrix $J_{C/BP}$ and the corresponding signs:

$$\frac{\partial \dot{d}_C}{\partial d_C} = d_C \left[\frac{\left(\frac{\partial \Omega_C}{\partial d_C}\right) d_C - \Omega_C}{d_C^2} - (1 + \psi)\frac{\partial g_C}{\partial d_C}\right] \text{ with } \frac{\partial \dot{d}_C}{\partial d_C} < 0 \text{ when } d_C \to 0 \text{ and } \frac{\partial \dot{d}_C}{\partial d_C} > 0 \text{ when } d_C \to \infty.$$

$$\frac{\partial \dot{d}_C}{\partial \sigma_C} = -d_C(1 + \psi)\frac{\partial g_C}{\partial \sigma_C} > 0$$

$$\frac{\partial \dot{d}_C}{\partial d_P} = -d_C(1 + \psi)\frac{\partial g_C}{\partial EX_C}\frac{\partial EX_C}{\partial EX_{C \to BP}}\frac{\partial EX_{C \to BP}}{\partial g_P}\frac{\partial g_P}{\partial d_P} \geq 0$$

$$\frac{\partial \dot{d}_P}{\partial \sigma_P} = -d_C(1 + \psi)\frac{\partial g_C}{\partial P_P^T}\frac{\partial P_P^T}{\partial i_P}\frac{\partial i_P}{\partial \sigma_P} > 0$$

$$\frac{\partial \dot{\sigma}_C}{\partial d_C} = \beta > 0$$

[11] $E_{C \to BP}$ stands for the center's exports to the big peripheral economy. $E_{BP \to C}$ represents the big peripheral economy's exports to the center.

$$\frac{\partial \dot{\sigma}_C}{\partial \sigma_C} = -\beta \frac{\partial \overline{d_C}}{\partial d_C^*} \frac{\partial d_C^*}{\partial \sigma_C} < 0$$

$$\frac{\partial \dot{\sigma}_C}{\partial d_P} = 0$$

$$\frac{\partial \dot{\sigma}_C}{\partial \sigma_P} = 0$$

$$\frac{\partial \dot{d}_P}{\partial d_C} = -d_P(1+\chi) \frac{\partial g_P}{\partial EX_P} \frac{\partial EX_P}{\partial EX_{BP \to C}} \frac{\partial EX_{BP \to C}}{\partial g_C} \frac{\partial g_C}{\partial d_C} \geq 0$$

$$\frac{\partial \dot{d}_P}{\partial \sigma_C} = -d_P(1+\chi) \frac{\partial g_P}{\partial P_C^T} \frac{\partial P_C^T}{\partial i_C} \frac{\partial i_C}{\partial \sigma_C} \geq 0$$

$$\frac{\partial \dot{d}_P}{\partial d_P} = d_P \left[\frac{\left(\frac{\partial \Omega_P}{\partial d_P}\right) d_P - \Omega_P}{d_P^2} - (1+\chi) \frac{\partial g_P}{\partial d_P} \right] \text{ with } \frac{\partial \dot{d}_P}{\partial d_P} < 0 \text{ when } d_P \to 0 \text{ and } \frac{\partial \dot{d}_P}{\partial d_P} > 0 \text{ when } d_P \to \infty.$$

$$\frac{\partial \dot{\sigma}_P}{\partial d_C} = 0$$

$$\frac{\partial \dot{\sigma}_P}{\partial \sigma_C} = 0$$

$$\frac{\partial \dot{\sigma}_P}{\partial d_P} = \delta > 0$$

$$\frac{\partial \dot{\sigma}_P}{\partial \sigma_P} = -\delta \frac{\partial \overline{d_P}}{\partial d_P^*} \frac{\partial d_P^*}{\partial \sigma_P} < 0$$

According to partial derivatives' signs, we deal with a Metzlerian matrix. Following Gandolfo (1996), a necessary and sufficient condition for stability thus requires upper-left minor principals of matrix $J_{C/BP}$ to alternate in sign starting with a minus sign associated to $(\partial \dot{d}_C / \partial d_C)$. Depending on the various signs that part of the above derivatives may assume, several stability scenarios exist. It is easy to see that the stability condition will be immediately violated in the case of a high debt-to-GDP ratio in the center, such that $(\partial \dot{d}_C / \partial d_C) > 0$. Let's thus consider the simplest and, say, safest possible scenario in which both the center and the big peripheral country present low values of their own debt-to-GDP ratios, so that: $(\partial \dot{d}_C / \partial d_C) < 0$; $(\partial \dot{d}_P / \partial d_P) < 0$; $(\partial \dot{d}_C / \partial d_P) = 0$ and $(\partial \dot{d}_P / \partial d_C) = 0$. In this context, it is immediately verifiable that:

$$\left| J_{C/BP}^1 \right| = \left| \partial \dot{d}_C / \partial d_C \right| < 0$$

$$\left| J_{C/BP}^2 \right| = |J_C| > 0$$

$$\left|J_{C/BP}^3\right| = (\partial \dot{d}_P / \partial d_P)|J_C| < 0$$

Once the above three sub-conditions have been satisfied, local stability also requires $\left|J_{C/BP}\right| > 0$. After a quite considerable amount of algebra, it is possible to show that:

$$\left|J_{C/BP}\right| = \frac{\partial \dot{d}_C}{\partial d_C}\frac{\partial \dot{\sigma}_C}{\partial \sigma_C}\begin{vmatrix}\frac{\partial \dot{d}_P}{\partial d_P} & \frac{\partial \dot{d}_P}{\partial \sigma_P}\\ \frac{\partial \dot{\sigma}_P}{\partial d_P} & \frac{\partial \dot{\sigma}_P}{\partial \sigma_P}\end{vmatrix} - \frac{\partial \dot{\sigma}_C}{\partial d_C}\left\{\frac{\partial \dot{d}_C}{\partial \sigma_C}\begin{vmatrix}\frac{\partial \dot{d}_P}{\partial d_P} & \frac{\partial \dot{d}_P}{\partial \sigma_P}\\ \frac{\partial \dot{\sigma}_P}{\partial d_P} & \frac{\partial \dot{\sigma}_P}{\partial \sigma_P}\end{vmatrix} - \frac{\partial \dot{d}_P}{\partial \sigma_C}\left(-\frac{\partial \dot{\sigma}_P}{\partial d_P}\frac{\partial \dot{d}_C}{\partial \sigma_P}\right)\right\}$$

That is:

$$\left|J_{C/BP}\right| = |J_C||J_P| - \beta\delta\left(\frac{\partial \dot{d}_P}{\partial \sigma_C}\frac{\partial \dot{d}_C}{\partial \sigma_P}\right) \gtrless 0 \tag{11}$$

From equation (11), the sign of $\left|J_{C/BP}\right|$ can be either positive or negative. In the first case, the four-by-four dynamic system is locally stable. Otherwise, instability arises. In a big center–big periphery context, stability cannot be assured even in the safest possible scenario assuming low initial values of debt-to-GDP ratios in both economies. Note that in such a context both systems would be stable if considered individually. Instability, however, may emerge due to the financial links connecting them (see cross-country factors $(\partial \dot{d}_C / \partial \sigma_P)$ and $(\partial \dot{d}_P / \partial \sigma_C)$). The more financially integrated countries are and the more exposed single-country credit institutions are to financial turbulences in the partner country, the higher the likelihood that financial instability in a big peripheral economy will extend to the center and give rise to generalized eurozone instability. Of course, instability would worsen even more should the periphery be in a more precarious position characterized by a high debt-to-GDP ratio. In such a case, a temporary and small shock may also generate explosive dynamics with negative effects on both peripheral and central economic activity.

In order to view the point in a perhaps clearer way, try to modify Figure 2 according to the new assumptions introduced. We do this in Figure 3. In Figure 3, the onset of the crisis follows the same lines seen in the case of a small peripheral country. However, possible center–periphery initial diverging trends may now be replaced with cross-country similar dynamics in the event that degrading financial conditions in the periphery impinge upon financial institutions' solidity in the center. In Figures 3a and 3b, this event is represented by a sequence of downward movements in the two loci for $(\dot{d}_C = 0)$ and $(\dot{d}_P = 0)$, which will now feed back into each other and spread financial and economic crisis in the overall eurozone. It is now easy to see that if such a perverse cycle effectively took place, no center–periphery diverging trends

would exist any longer. Quite the opposite, the breakdown of the overall eurozone would appear as more than a concrete possibility.

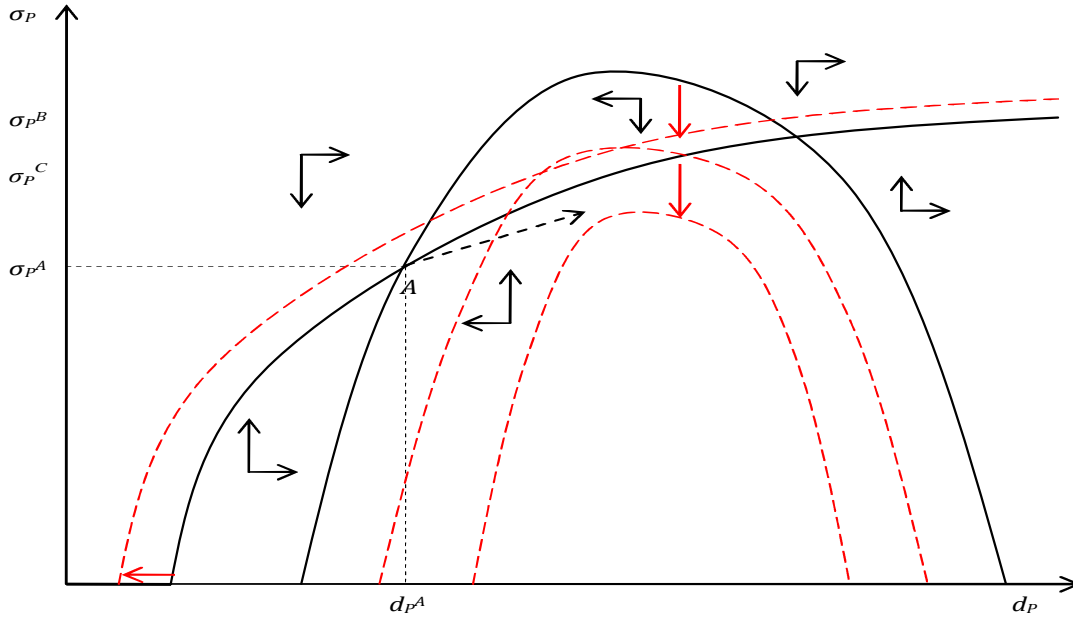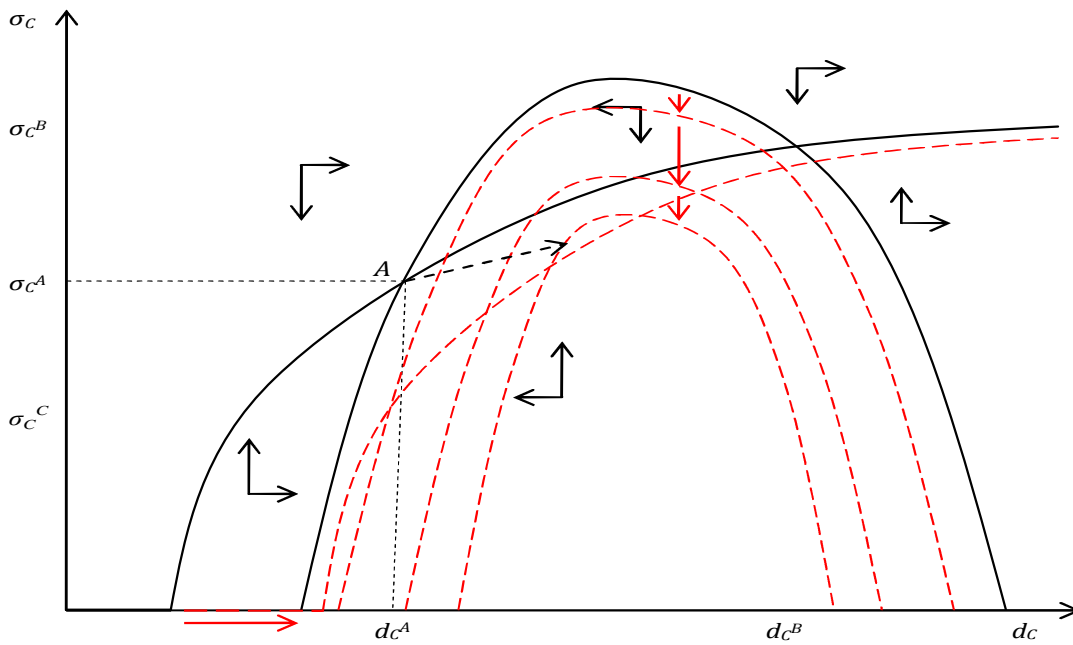*Figure 3a* Periphery financial instability in the center–*big* periphery case

Figure 3b Center financial instability in the center–*big* periphery case

4. THE MYOPIC LOGIC OF FISCAL AUSTERITY AND THE NEED FOR A MONETARY SOVEREIGN EUROPEAN FEDERAL GOVERNMENT

According to the analysis above, center–periphery diverging trends and conflicting claims may disappear in the event that default risks deepen in big peripheral economies and also spread in central member states. It is thus sensible to wonder what kind of common response euro member states could adopt, if ever, to avoid the risk of a dramatic euro system breakdown. Must member countries continue to pursue fiscal austerity and rigorously adhere to the so-called Fiscal Compact? Alternatively, is there hope for a reformation of the euro system toward the creation of a fully sovereign federal European Union that would allow more space for a federal expansionary fiscal policy?

As to the strategy based on fiscal austerity, the Fiscal Compact adds very little the already operative Stability and Growth Pact (SGP), and it does not exclude, a priori, expansionary fiscal stances to be adopted under the circumstances of extraordinary events. Nevertheless, it notes even more strongly than before the balanced budget principle as the general rule euro member states must follow. First, such a rule must be enforced through member states' laws—and it would be better if they were constitutional laws. Second, fiscal deficits must be temporary and short-lived. Euro member states are ordered to put automatic mechanisms in place to rapidly downsize fiscal deficit deviations from their medium-term targets, even in the case of temporary deviations justified by extraordinary circumstances. The general philosophy of the Fiscal Compact is such that fiscal policy should be used only limitedly as a stabilization tool, and that euro member countries should be prohibited from running considerable fiscal deficits in the same ways that sovereign states like the US, the UK, and Japan have been doing since 2007.

According to our analysis, this type of tighter euro country coordination does not address the core point of the eurozone's difficulties. Indeed, all of the perverse center–(big) periphery mechanisms that can deepen economic recession and spread it in the overall eurozone are still at work even in the presence of the Fiscal Compact. To see this, assume that, under the provisions of the Fiscal Compact, the two loci for $(\dot{\sigma}_C = 0)$ and $(\dot{\sigma}_P = 0)$ are considerably steep and start from the origin of the axes in the furthest left possible position.[12] Assume, also, that both the

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[12] The Fiscal Compact dictates that euro countries have a structural public balance deficit no higher than 0.5 percent of GDP (1 percent in the case of euro countries with a debt-to-GDP ratio lower than 60 percent). In terms of our

center and the periphery have initial debt-to-GDP ratios in line with the corresponding long-run values d_C^* and d_P^* implied by the Fiscal Compact and, therefore, equal to zero. We depict these scenarios in Figures 4a and 4b.

Figure 4a Periphery financial instability in the presence of the Fiscal Compact
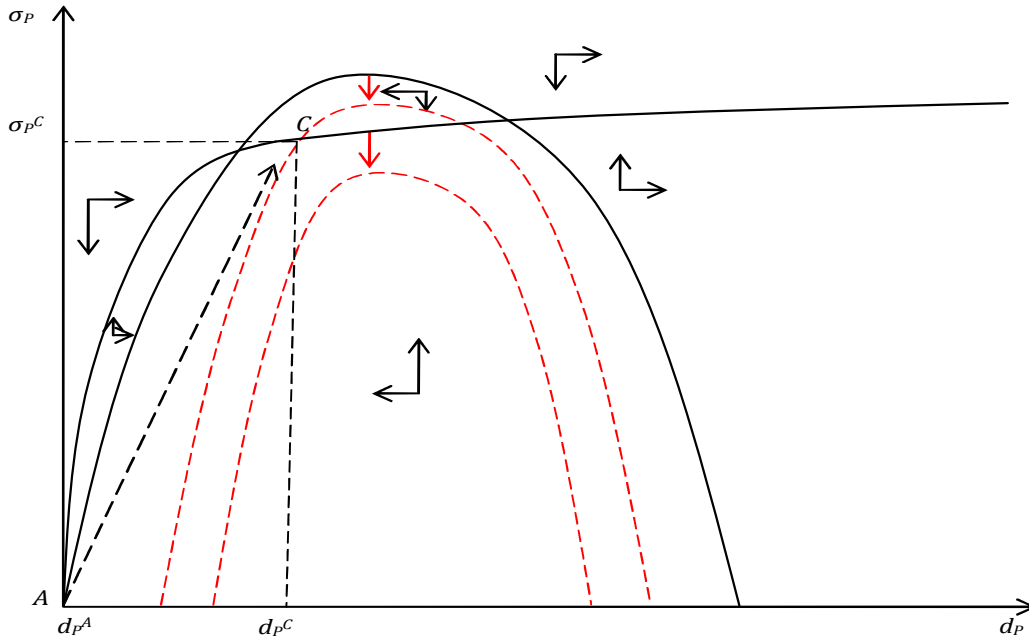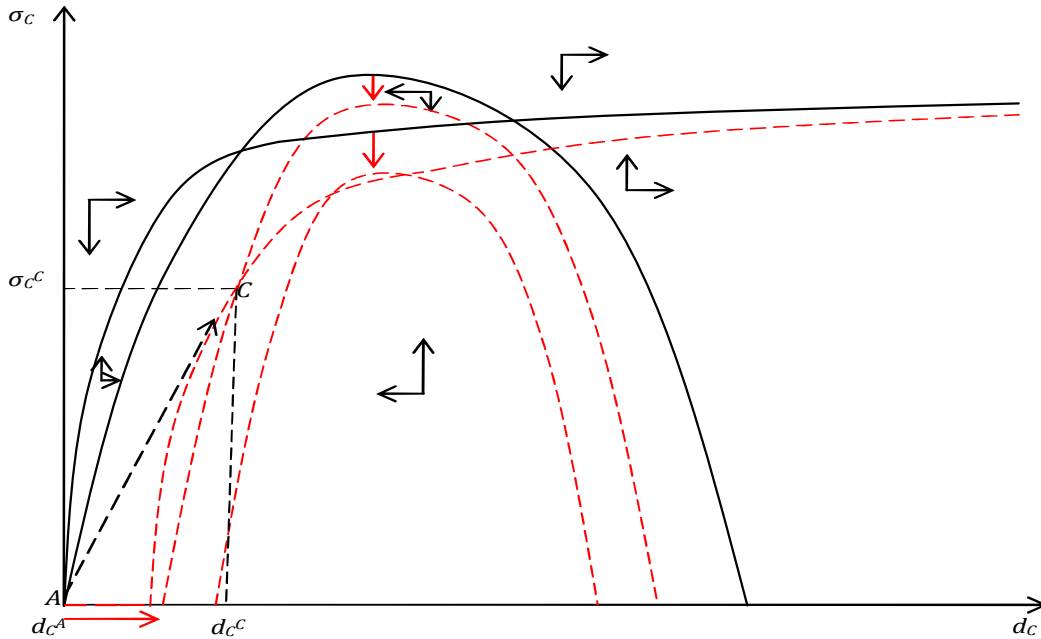

Figure 4b Center financial instability in the presence of the Fiscal Compact

model, this would imply a surplus or, at least, a balance equilibrium in the primary public budget, hence $\Omega_{C(P)}^* \leq 0$ and $d_{C(P)}^* \leq 0$. For simplicity, here we assume such inequalities to hold with strict equality signs.

Now imagine that a global recession like the 2007–08 crisis hurts. Accordingly, the two loci for $(d_C = 0)$ and $(d_P = 0)$ move downwards. Again, despite capital flights from the periphery to the center, euro countries' risk factors may increase in both economies and trigger the downward spiral we have already seen above. Furthermore, the automatic fiscal correction mechanisms envisaged by the Fiscal Compact may even destabilize debt-to-GDP ratios in euro member countries. First, restrictive national fiscal stances may exacerbate economic recessions in their own countries and, this way, hinder fiscal consolidation itself. Second, a fallacy of composition problem may arise. Actually, in presence of a systemic recession, all euro member countries will have to simultaneously implement fiscal corrections regardless of the effective solidity of their public balances. Fiscal austerity in the big periphery will thus jeopardize growth and economic recovery in the center, which, in turn, due to its own fiscal stabilization package, will reduce economic activity in the periphery. Eventually, the obsession with fiscal austerity may result in a eurozone center–periphery lose–lose scenario.

Reforms in European governance and in the coordination of member states' economic policies should aim to strengthen euro countries' fiscal solidity and, at the same time, provide enough room for expansionary counter-cyclical policies. Austerity packages alone do not help growth and eventually risk endangering public balance stability. Fiscal consolidation and the balanced budget rule foreseen by the Fiscal Compact may somehow be useful if they are to be part of a much wider reform agenda. The final achievement of such agenda should be the creation of a full-fledged European federal union. According to the analysis above, such a political entity should rely on two main features.

1. Due to financial market distress, euro member states and in particular peripheral countries are de facto prevented from running expansionary fiscal policies. Fiscal policies should therefore be implemented by European authorities. In institutional terms, this amounts to saying that the current eurozone should be transformed into a federal union with a federal government charged with running fiscal policies eventually financed by issuing European treasury bills. More specifically, a fully developed European federal government should have the right to levy federal taxes on European citizens and to dispose of a federal budget. The European government should provide some social services connected, for instance, to the pension system and unemployment safety nets. Lastly, the federal European government should implement a European industrial policy whose aim, among several others, is to progressively eliminate

structural differences among euro countries and to level-off regional inequalities. Actually, diverging trends among central and peripheral euro countries also depend on their asymmetric productive structures. The ensuing eurozone imbalances and member countries' different capabilities to deal with economic recessions can hardly be eliminated through painful macroeconomic adjustments and internal devaluations aimed at improving cost competitiveness only. Long-term industrial and development policies can do this. The process of market integration and the European competition policy limit the possibility of national governments running industrial and regional policies on their own. These kinds of policies must thus be implemented at the European level.

2. The future European federal union must have full monetary sovereignty. In this sense, the ECB should be transformed into the central bank of the European federal union and should be empowered with a lender-of-last-resort function. According to the MMT, this passage is fundamental to stop financial speculation and avoid any possible fear about a European federal government's financial soundness. Moreover, such a change does not threaten central bank independence from the political sphere. Actually, it is useful to keep clear in mind the difference between an independent central bank and a detached central bank (Palley 2011). In the first case, the central bank is absolutely free from external influences in its decision making and can freely decide to buy or not to buy government bonds according to the objectives of the monetary policy. In the second case, the central bank is explicitly prohibited from buying government bonds or any other public institution liability. While this last case corresponds to the current ECB, the US Federal Reserve and the Bank of England are examples of independent but not detached central banks. Future developments of the ECB should move it toward such models in order to provide the European federal union with the complete prerogatives and financial credibility of sovereign states.

What would the consequences of these institutional changes be in our center–periphery model? First, thanks to the existence of a European federal government, the costs of anti-cyclical measures will move largely from national public balances to the European federal budget. Accordingly, while member states may safely pursue some form of a balanced budget rule without hampering economic activity, growth can be supported and reinstigated more

quickly by counter-cyclical policies adopted by the federal government.[13] In terms of the graphical representations above, loci for stable debt-to-GDP ratios in both the center and in the periphery will barely move downward or will remain in the same original positions. Second, and perhaps more relevantly, financial markets won't react so nervously to the outbreak of the crisis and won't give rise to center–periphery capital flights. Actually, fiscal stimuli to economic activity and financial system rescue programs will not burden national government balances, so no fear of national government insolvency will upset financial markets. Speculative forces will not gain strength; liquidity will not dry in the periphery and move to the center. Accordingly, no asymmetric movements in the two loci for stable values of σ_C and σ_P will take place and euro members' country risk factors will not be revised upward. In this much safer context, it is easy to see that all of the feedback mechanisms giving rise to a race to hell and to a perverse spiral between increasing debt service costs, fiscal correction, and deepening crisis will likely be broken.

Of course, considerable fiscal deficits may now emerge at the federal level, with the federal European government financing expenditures by issuing eurobonds. However, eurobonds will hardly be subjected to speculative attacks, since financial markets will know perfectly well that the European government has full monetary sovereignty and that the ECB will back it if financial turbulences emerge. Actually, eurobonds appear to be safe assets and temporarily represent the best options for portfolio investment so long as recession has ended, economic activity has recovered, and private assets have returned to the favor of financial operators. This seems to be what is occurring in sovereign states such as the US, the UK, or Japan, where treasury bills' interest rates are at never-before-seen low levels despite remarkable fiscal deficits—actually higher than those recorded on average in the eurozone—and fast increasing debt-to-GDP ratios (De Grauwe 2011, 2012).

5. CONCLUSIONS

In this paper, we argue that in the aftermath of the 2007–08 crisis, the *incomplete* nature of the euro system—as compared to a fully developed federal union—created an environment conducive to the emergence of diverging trends between central and peripheral member states.

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[13] See Auerbach (2008) and National Conference of State Legislature (2010) on such a type of institutional arrangement in the US.

Such divergences and the ensuing conflicting claims can now seriously feed peripheral countries' crises. Even worse, they may eventually spread instability across Europe and, paradoxically, eliminate any center–periphery dichotomy should financial turmoil also deepen large peripheral economies.

The strategy adopted so far to end the crisis has been generalized fiscal austerity. However, the results have been disappointing since the crisis persists and may even worsen. In our view, a more general reform agenda, whose final purpose is the introduction of a federal European government together with a lender-of-last resort government banker, is the decisive step to end the crisis.

We are well aware that the creation of a fully operative eurozone federal government is a far-reaching objective that will be ferociously disputed and cannot realistically provide immediate relief from existing difficulties. Accordingly, what are some initial and perhaps narrower steps to be taken in the short run to stop the crisis? In the most recent period, economic chronicles have placed emphasis on new monetary measures established by the ECB. Attention is on the ECB Board announcement of an unlimited euro country bond-buying program aimed at striking speculation, reducing interest rates and debt service costs, and favoring fiscal consolidation in peripheral economies. We all know that these measures are the result of intensive political bargaining among euro countries' heads, the ECB, and European institutions. Furthermore, they do not have the support of all the authorities involved in the decision process (see the opposition of the Deutsche Bundesbank), and their adoption is conditional to the launch of austerity programs and structural reforms in the countries aided.

Despite these limitations, there is no doubt that the ECB's unlimited bond-buying program stands out as the most reasonable initiative policymakers could take to tame the crisis in the short term. It probably represents the first measure to emendate the strict monetarist paradigm inspiring the ECB statute. This monetary measure is not enough. Actually, sustained growth and full recovery from the recession will hardly take place without considerable expansionary fiscal stances. Nevertheless, it will be much easier to find room for expansionary stances, at national levels and at the European level, in the presence of an interventionist monetary policy that contrasts financial speculation and ensures financial markets that the "euro is irreversible" (Draghi 2012).

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