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The theoretical inconsistency of the expansionary austerity doctrine (reprise): An extension to the long run

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Abstract

In this paper, we provide a critical analysis of the theory of the expansionary austerity (EAT). Our attention is on the *theoretical* weaknesses of the EAT, say the extreme circumstances and fragile assumptions under which expansionary consolidations might actually take place. We present a simple theoretical model that takes inspiration from both the post-Keynesian and evolutionary/institutionalist traditions. We first show that well-designed austerity measures hardly trigger off short-run economic expansions in the context of expected long-lasting consolidation plans (i.e. when adjustment plans deal with remarkably high debt-to-GDP ratios); when the so-called ‘financial channel’ is not operative (i.e. in the context of monetarily sovereign economies); when the degree of export responsiveness to internal devaluation is low. Even in the context of non-monetarily sovereign countries (see Eurozone countries), austerity’s effectiveness crucially depends on its highly disputable capacity to immediately stabilize fiscal variables. We then analyse some possible long-run economic dynamics. We emphasize the high degree of instability that characterizes austerity-based adjustments plans. Path-dependency and cumulativeness make the short-run impulse effects of fiscal consolidation of paramount importance to (hopefully) obtain any appreciable medium-to-long-run benefit. Should these effects be contractionary on the onset, the short-run costs of austerity measures can breed an endless spiral of recession and ballooning debt in the long run. If so, in the case of non-monetarily sovereign countries debt forgiveness may emerge as the ultimate solution to restore economic soundness. Alternatively, institutional innovations like those adopted since mid-2012 by the ECB are required to stabilize the economy, although not to prompt sustained recovery.

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1. The theory of expansionary austerity and its critiques: An overview

The theory of expansionary austerity is part of a long-standing debate in economic literature on the effectiveness of fiscal policy. Nonetheless, the theory of the ‘expansionary fiscal austerity’ as we currently know it emerged at the beginning of the 90s when some economists started to argue that discretionary expansionary fiscal policies may have non-Keynesian effects (see Giavazzi and Pagano, 1990 and 1996; Alesina and Perotti, 1995; more recently, see Alesina and Ardagna, 2010 and 2012). According to them, at least under certain circumstances¹, expansionary fiscal policies may be ineffective to stimulate economic activity, and may actually put at risk the solidity of the financial system by giving rise to unsustainable fiscal stances. Symmetrically, *well-conceived* fiscal restrictions may stimulate private consumption and investment, as well as improve export dynamics. Eventually, economic activity may expand rather than contract, and give rise to a case of expansionary fiscal consolidation.

The vast majority of the existing critiques to the EAT has addressed the shortcomings of the econometric techniques adopted by EAT supporters in order to empirically validate their theoretical propositions. A first strand of criticisms points to the concept of (changes in the) cyclically adjusted primary balance (CAPB) as erroneous and misleading measure of discretionary fiscal policy shocks (see Guajardo et al., 2011; Baker and Rosnick, 2014). A second critique raises the issue of an inverse causality between economic dynamics and fiscal policy, since that different phases of the business cycle may have relevant implications as to the restrictive/expansionary fiscal stances governmental authorities may eventually adopt (Baker and Rosnick, 2014). Finally, a growing body of empirical analyses provides evidence of a cycle-contingent fiscal multiplier, which is largely positive during recessions (Guajardo et al., 2011; Auerbach and Gorodnichenko, 2012; Qazizada and Stockhammer, 2015). It is easy to see how this evidence is radically at odds with the concept of a negative fiscal multiplier implicitly advocated by the expansionary austerity doctrine.

The aim of this paper is not to add another piece to the abundant literature on the econometric reliability of the EAT. Rather, we want to move the focus of the analysis to the theory, and enquire the theoretical solidity of the expansionary austerity viewpoint. So far, a few works have tried to *analytically* underline the theoretical weaknesses of the EAT from a heterodox perspective. In our view, these contributions are not completely satisfactory. On the one hand, they often rely on quite ad-hoc assumptions. On the other hand, they model austerity packages too roughly, without considering the specific policy measures composing them. In this paper, we try to fix these shortcomings by presenting a simple theoretical model.

The final goal of our model is twofold. First, we critically investigate the influential assertion by Alberto Alesina according to which “many even sharp reductions of budget deficits have been accompanied and immediately followed by sustained growth rather than recessions even *in the very short run* [cursive is of the authors] (Alesina, 2010, p.3)”. In this sense, we stress that the theoretical fundamentals and economic mechanisms of the

¹ See Sutherland (1997) for the case of possible non-Keynesian effects of expansionary fiscal measures when undertaken in a context of *high public debt*. Perotti (2012) also stresses that fiscal contractions may be expansionary in presence of *high interest rates*, in particular when they contribute to reduce risk premia on financial assets, on government bonds first of all, and prompt a considerable reduction in nominal interest rates.

expansionary austerity hypothesis are extremely fragile, and state- and institutional-contingent, to say the least. Second, we analyze the long-run dynamics possibly set in motions by austerity measures. Our aim is to criticize the idea that fiscal consolidations might imply short-term costs, but lead to far larger medium-to-long-run benefits in the form of safer and sounder public finances, stable or decreasing public debt-to-GDP ratios, revived economic activity as stimulated by booming investments in the private sector². We rather stress that austerity-induced short-run costs and long-run benefits may be inconsistent with each other. Indeed, even mild recessionary responses to adjustment programs may give rise to instable evolutions in the public debt-to-GDP ratio, so that the short-run costs of austerity measures may eventually breed even larger long-run damages (rather than benefits).

Our model takes inspiration from the post-Keynesian and evolutionary/institutionalist tradition. From the post-Keynesian tradition, we take the demand-driven logic that permeates the functioning of our model. We also pay attention to the importance that mounting Keynesian-type radical uncertainty after the eruption of the sovereign debt crisis in the Eurozone may have played and may still play in defining economic actors' expectations and behaviors. According to the evolutionary approach to systems' dynamics (Radzicki and Sterman, 1994), we describe an economy in which cumulative mechanisms may give rise to path dependence and multiple equilibria. We also put emphasis on the crucial role country-specific institutions play in shaping diverging economic trajectories. We note that austerity may lead to different outcomes depending on the specific 'monetary environment' in which it is implemented. Whilst the short-run expansionary outcomes of austerity measures hardly emerge in monetary sovereign (say the USA, the UK, Canada or Japan) and non-monetary sovereign countries (i.e. nowadays Eurozone member states) alike, the way central banks intervene to stop financial distress turns out to be a decisive factor in order to tame or feed long-run macroeconomic instability. In the case of non-monetarily sovereign countries, in the absence of any deep institutional discontinuity, debt forgiveness may eventually emerge as the ultimate solution to restore economic soundness. This fact notwithstanding, the changes in monetary institutions' commitments taking place in the Eurozone since mid-2012 also show that economic variables and institutional factors may eventually *co-evolve* in response to existing economic problems. Such a joint *endogenous* evolution may give rise to structural breaks through which new and much more stable dynamics set in, even though not a solid recovery yet.

The paper is organized as follows. Section 2 develops the short-run part of our model. We model the *well-designed* consolidation packages advocated by the supporters of the EAT, and analyze their impact on current economic activity and on the deficit-to-GDP ratio. Section 3 moves to the long run and shows how fiscal variables (and eventually economic institutions) may (co-)evolve through time as a consequence of (and perhaps in reaction to) the short-run effects assessed before. Section 4 concludes.

² According to Warmedinger *et al.* (2015), "the medium-to-longer-term benefits of well-designed fiscal consolidation are typically accompanied by short-term costs in the form of output losses, [but] since sound government finances are a prerequisite for price and macroeconomic stability and, consequently, for strengthening the conditions for sustainable growth, the long-term benefits of achieving such goals outweigh the short-term costs (Warmedinger *et al.*, 2015, p.1)".

2. Short-run expansionary/contractionary effects of fiscal adjustments in a simple open economy

To the best of our knowledge, only a few non-mainstream studies have aimed at analytically showing the intrinsic theoretical fragility of the expansionary austerity doctrine.

Robert Boyer (2012) surveys the specific conjunctures under which, in the past, austerity measures might have been expansionary in a few small open economies. He stresses that there is “no general theoretical reason to guarantee the success of any austerity policy (Boyer, 2012, p.297)”. Nevertheless, Boyer does not provide any formal treatment of his point.

Palley (2010) elaborates a simple post-Keynesian demand-driven *closed-economy* model showing the short-run effects of fiscal rules imposing limits to the debt-to-GDP ratio. Dosi *et al.* (2015) present an evolutionary model featuring complex micro-macro interactions. They extend the scope of Palley’s analysis by considering the long-run consequences austerity-imposed ceilings to government deficits may display on trend growth and macroeconomic volatility by affecting R&D efforts and technology progress. Yet, both models have some common drawbacks. They are somehow unsuitable to confute the EAT on its own ground since that their theoretical frameworks engineer *in-built* contractionary outcomes of austerity measures³.

Foresti and Marani (2014) propose a simple short-run model in which austerity may have expansionary outcomes depending on the accommodative stance monetary policy may take in presence of fiscal retrenchments. In doing this, however, they still superficially define austerity as a reduction in public deficit, this way taking the squeezing effects of fiscal consolidation on public deficit as granted.

In this paper, we propose an analytical treatment of the argumentative approach developed by Boyer (2012). With respect to Palley (2010) and Dosi *et al.* (2015), our model allows for a wider variety of results, so that EAT may be criticized more effectively by arguing about the implausibility of its own assumptions and mechanisms. With respect to Foresti and Marani (2014), our model is more detailed in the analysis of the specific policy measures composing well-designed austerity packages, but at the same time it is more general in the type of results it may give rise (i.e. shrinking or widening fiscal deficits).

Let assume an open economy. Further, let assume that the economy does not work at full potential in order to allow for (fiscal) policy-driven expansions of aggregate demand and, hence, current economic activity. Indeed, the expansionary austerity literature argues that well-designed fiscal adjustments can boost economic activity through both supply and demand channels⁴. This fact notwithstanding, most of its emphasis is on demand-side channels, perhaps in order to stress its non-Keynesian perspective on the effects of fiscal

³ Palley (2010) and Dosi *et al.* (2015) consider simple *closed* economy in which, by default, the ‘external channel’ through which austerity is supposed to deliver some expansionary results is inoperative. Also, both model identify austerity with deficit-cutting rules. They do not enter into the details of what is considered a well-designed consolidation plan.

⁴ Alesina and Ardagna (2010) argue that lower public sector employment, lower public sector wages, and (or) lower degrees of labor market protection (say cut in unemployment benefits), tend to reduce trade unions’ bargaining power and to increase individual labor supply. In the context of supply driven mainstream models, this may eventually stimulate growth by leading to an expanding aggregate supply.

policies⁵. In line with this logic, and with the attempt to show its shortcomings, here we focus on the operativeness of the demand-side levers only.

Our economy is composed by six sectors: working households, rentiers, (non-financial) firms, the government, commercial banks, and, ultimately, the ‘Rest of the World’ (RoW henceforth).

Working households get wages (w) from non-financial firms. They consume domestic goods (C), import foreign-made products, and pay taxes according to the tax rate t . They also receive public transfers (Tr^G) and unemployment benefits ($\bar{w}U$) from the government. Working households’ savings take the form of new deposits to commercial banks.

Rentiers get dividends from commercial banks⁶, as well as interest payments on their holdings of foreign financial assets. For the sake of simplicity, we assume rentiers not to consume. Rentiers use their savings in order to accumulate new foreign financial assets according to a sort of Panama papers-type investment fashion.

Non-financial firms pay wages to workers and make interest payments ($i_H L$) on the stock of loans from commercial banks. They get revenues through workers’ consumption expenditures, government purchases, exports to the RoW (XE), and domestic gross capital formation (I). Realized profits (Π) are fully retained⁷ in order to finance desired capital accumulation together with new loans (dL) from commercial banks.

Commercial banks provide loans (L) to domestic firms and buy domestic government’ bonds. Accordingly, they get interest payments ($i_H L$) from domestic firms and ($i_D D^{H_b}$) from the government. Commercial banks receive deposits from households. We assume interest rates on households’ deposits to be equal to zero. Commercial banks’ profits are fully redistributed to rentiers. New equity issuances are not considered in the present paper.

The government undertakes current consumption expenditures (G), and makes transfers to working households. It also levies taxes on working households’ income. In the expansionary austerity literature, taxes on households’ income represent a crucial component of ‘well-designed’ austerity packages. Alesina and Perotti (1997) argue that successful fiscal consolidations (‘type-1 adjustments’ in the jargon of the authors) “rely primarily on expenditure cuts, in particular cuts in transfers, social security, government wages, and employment [whilst] tax increases are a small fraction of the total adjustment, and, in particular, taxes on households are not raised at all or are even reduced (Alesina and Perotti, 1997, p.211)”. On the contrary, contractionary “type-2 adjustments rely mostly on broad-based tax increases, and often the largest increases are in taxes on households and social security contributions (Alesina and Perotti, 1997, p.211)”⁸. Consistently with this

⁵ Alesina *et al.* (2015) clearly point out that a decisive aspect of successful austerity packages lies in their capacity to stimulate private sector’s investments by fostering private sector’s confidence in the solidity of the domestic macroeconomic environment. Such a peculiar component of (successful) expenditure-based fiscal consolidations versus (unsuccessful) tax-based adjustments “cannot be explained by (accompanying) supply side reforms (Alesina *et al.*, 2015, p.37)”; it implicitly relies upon the existence of a ‘negative’ fiscal multiplier of aggregate demand.

⁶ We assume rentiers to be the ultimate owners of commercial banks by holding commercial banks’ equities.

⁷ In the age of financialization of non-financial firms and increased shareholder value orientation, this represents a strong assumption. Yet, it is fully consistent with the focus of this paper on the macroeconomic effects of austerity measures rather than on the intrinsic evolution of modern capitalist economies. This assumption does not reduce in any way the degree of generality of our analysis, whilst it makes it more tractable from a mathematical point of view.

⁸ Alesina and Perotti (1997) also stress that spending cuts matched with (expected) reductions in households taxes may lead to expansionary outcomes by reducing workers’ wage claims, by inducing wage moderation, and hence by increasing the external competitiveness of homemade goods.

logic, here we will critically enquire whether, and under which conditions, spending cuts could be successfully matched with (expected) reductions in households' taxes in order to make fiscal consolidations expansionary. For the sake of simplicity, we do not include in our model taxes on rentiers' income or firms' profits (or indirect taxes).

The difference between government's revenues and total expenditures gives public surplus (or deficit). Public deficit is financed by issuing new government bonds ($B=dD$). Both commercial banks and the RoW buy domestic government bonds.

As to international trade flows, the RoW sells us imported goods in the amount (XM) and buys exports (XE). As to financial transactions, financial outflows are given by domestic rentiers' accumulation of new assets abroad. Financial inflows take the form of new home government bonds net purchases by the RoW, i.e. ($B_{RoW} = dD_{RoW}^H$). In this regard, the decision of foreign investors to buy home government bonds (rather than 'keeping their money abroad') relies upon the well-known uncovered interest rate parity (UIP). Exchange rate fluctuations, and the ensuing exchange rate risk, constitute a relevant factor in defining the UIP. For the sake of simplicity, here we depart from this complication and do not explicitly take into account exchange rate dynamics in determining, through the UIP, the interest rate on home government bonds (see below). In the specific case of Eurozone countries, this assumption is justified by the fact that intra-Eurozone financial flows are not affected by any consideration (or concern) about exchange rate dynamics.

2.1 The model

Let assume the economy to produce according to a fixed-coefficient production technique. Equation (1) defines the current level of economic activity (Y) as a function of the level of capacity utilization ($y = Y/Y^*$)⁹, the output-capital technological coefficient $\beta (=Y^*/K)$, and of the available capital stock (K).

$$(1) Y = \frac{Y}{Y^*} \frac{Y^*}{K} K = y\beta K$$

Given labor productivity (α) and the total labor force (N), equations (2) and (3) define the level of unemployment (U) and the unemployment rate (u), with (δ) as the ratio of potential output over the maximum amount of goods producible according to labor productivity and the available labor force¹⁰.

$$(2) U = N - E = N - (Y/\alpha)$$

$$(3) u = \frac{N - (Y/\alpha)}{N} = 1 - \frac{Y}{Y^*} \frac{Y^*}{\alpha N} = 1 - \delta y$$

As far as the labor market is concerned, we assume workers and trade unions to target a desired real wage rate and therefore, given labor productivity, a desired wage share ($1-\tau_w$) (' τ_w ' being the profit share implicitly consistent with trade unions' target). We assume the

⁹ Y^* stands for potential output, i.e. the maximum amount of output the economy could produce by fully utilizing the available capital stock.

¹⁰ In this model, we assume that possible bottlenecks taking place on the supply side of the economy take the form of shortage of productive capital rather than, strictly speaking, shortage of labor. Therefore, the economy will be always characterized by a certain, say, *structural* degree of unemployment.

bargaining power of trade unions to positively depend on the degree of regulation and protection of workers on the labor market, say the generosity of unemployment benefit \bar{w} among other factors. Accordingly, we assume $(1-\tau_w)$ to be a positive function (and, correspondingly, τ_w a negative one) of the 'labor market regulation variable' (z). Equation (4) defines the nominal wage rate (w) bargained by trade unions on the basis of their targeted wage share and their price expectations (P^e):

$$(4) w = (1 - \tau_w(z(\bar{w})))P^e \alpha$$

Firms, on their side, target a desired profit rate (r^d). Given their expectations about the level of capacity utilization (y^e) – see more on this below, they set the mark-up (m) on variable costs and the ensuing profit share (τ) on domestic income consistently with their goals. Equations (5) and (6) formalize firms' behavior and its implications in terms of the price setting-rule of the home-good price (P^H):

$$(5) r^d = \tau(m)y^e \text{ hence } m = \tau(r^d/y^e)^{-1} \text{ with } (\partial\tau/\partial r^d) > 0; (\partial\tau/\partial y^e) < 0$$

$$(6) P^H = (1 + m)w/\alpha$$

In our open economy, equations (5) and (6), together with foreign prices (P^F) and the nominal exchange rate (e) concur to determine the real exchange rate (q), see equation (7) below:

$$(7) q = \frac{eP^F}{P^H} = \frac{eP^F}{(1+m)(1-\tau_w)P^e}$$

Once described the production side of the economy, let analyze the components of aggregate demand. As to domestic consumption, let first assume it is a positive function of working households' disposable income. Disposable income in turns depends on the wage bill $W (=wE)$, public transfers (Tr^G), and unemployment benefits ($\bar{w}U$). Once paid taxes according to the taxation rate (t), a proportion (s) of disposable income is saved. Consumption expenditures are then allocated on domestic goods and imported ones according to the spending shares $\eta(q)$ and $(1-\eta)$ respectively, η being a positive function of the real exchange rate q . Equation (8) eventually defines consumption demand for home-made goods normalized by the domestic capital stock:

$$(8) \frac{c}{P^H K} = (1 - s)(1 - t)\eta \left[\frac{\beta}{\alpha}(\omega - \bar{w})y + \frac{\beta}{\alpha}\bar{w} + \rho \right]$$

With $\omega (= w/P^H)$ and $\bar{w} (= \bar{w}/P^H)$ as the real wage rate and the real unemployment benefit (in terms of the price of the home-made good) – with $\omega > \bar{w}$, and $\rho (= Tr^G/P^H K)$.

In line with the literature on expansionary austerity, we assume that, according to, say, a permanent income argument, households' saving propensity (s) depends positively on the expected future tax rate t^e . Current cuts in public expenditures, if sufficiently strong and reliable, may induce households to increase current consumption since that they may expect a lower tax burden tomorrow. By the same token, we also assume households' saving propensity to depend negatively on public transfers. Indeed, it is reasonable to

believe that a permanent cut in public transfers, perhaps due to the decision of downsizing the provisions of the welfare system (read a less generous domestic pension system), may also induce households to adopt a precautionary stance and save more today in anticipation of lower public transfers tomorrow¹¹. Equation (9) below put the above considerations in formal terms:

$$(9) s = f(t^e, Tr^G) \text{ with } (\partial s / \partial t^e) > 0; (\partial s / \partial Tr^G) < 0$$

Equation (10) gives public purchases, once again normalized for the existing capital stock K , as an exogenous policy variable γ .

$$(10) \frac{G}{p^H K} = \gamma$$

Equation (11) defines the current growth rate of the capital stock. For the sake of simplicity, following Taylor (2012), we assume that investment demand is purely *autonomous* in the short run, so that it does not depend on *current* capacity utilization. Perhaps consistently with a Harrodian interpretation of Keynesian macroeconomics, and in order to capture the ‘expectation argument’ put forward by the EAT, we first imagine entrepreneurs to define the desired increase in the available capital stock according to their *expectations* about capacity utilization (y^e)¹². On the one hand, entrepreneurs will increase investments should they expect the economy to expand and capacity utilization to be high in the future. On the other hand, they will scale down investment projects if a vulnerable and unsound macroeconomic environment spreads negative expectations of a contracting economic activity.

We also assume investment demand to be a negative function of the costs of external borrowing (i_H). Once again, this assumption aims at grasping one of the pillars of the expansionary austerity building, i.e. the expansion in private investments possibly triggered off by austerity measures prompting a reduction in interest rates.

$$(11) \frac{I}{K} = g(y^e, i_H)$$

With $g_{y^e} > 0$ and $g_{i_H} < 0$.

Finally, in equation (12), we assume normalized exports to be a simple linear positive function of the real exchange rate q .

$$(12) \frac{EX}{p^H K} = \epsilon q$$

As to the ‘financial’ side of the economy, let first consider how private firms finance their desired investment expenditures. In this model, we assume that non-financial firms

¹¹ The same logic may apply in presence of a reduction of public benefits to unemployed people that perhaps makes average *expected* income lower.

¹² See again the recent contribution by Alesina *et al.* (2015) on the crucial role entrepreneurs’ expectations, and hence investment, may play in giving rise to what they interpret as examples of (spending-based) expansionary fiscal consolidations.

retain all profits in order to fund capital accumulation. Additionally, they take loans from commercial banks (dL) for the part of investments not covered by internal funds. In the real life, it is obviously possible that commercial banks ration available credits so that not all investment projects are eventually financed. For the sake of simplicity, we do not take this eventuality explicitly into account. Yet, commercial banks fix the interest rate (i_H) charged on loans to non-financial firms. In periods of financial distress, commercial banks very likely increase the mark-up rate through which they determine i_H (see more on this below). By doing this, they increase the cost of external financing of non-financial firms' investments, and implicitly cut the total amount of financed investment projects¹³.

Commercial banks holds two types of assets on their balance sheet. On the one hand, they buy domestic government bonds. On the other hand, they concede loans to firms. Government bonds are considered as 'relatively' safe assets. Indeed, they constitute the collaterals commercial banks commonly use in refinancing operations with the central bank even in periods of financial turbulences on the market for sovereign bonds. On the contrary, loans to firms are considered as 'relatively' riskier. Following Mehrling (2011), commercial banks may not be allowed to shift private sector's loans on the balance sheet of the central bank or of other financial institutions. Once created, loans to the private sector will likely remain on their own balance sheet until maturity, together with the corresponding creditor risk. Accordingly, we assume commercial banks to set the interest rate (i_H) on loans to the private sector by applying a mark-up (μ) on the interest rate (i_d) got on government bonds (see equation (13))¹⁴.

$$(13) i_H = (1 + \mu)i_d$$

Public deficit and, hence, new bonds' issuances, are given by the difference between government's outlays, i.e. public purchases, public transfers, unemployment benefits, and interest payments on the accumulated public debt stock (Ψ), and tax revenues. The following expression defines public deficit in nominal terms, whilst equation (14) normalizes it by the capital stock:

$$dD = G + Tr^G + \bar{w}U - t[wE + Tr^G + \bar{w}U] + \Psi$$

Hence:

$$(14) \frac{dD}{pHK} = \gamma + (1 - t) \left(\rho + \bar{w} \frac{\beta}{\alpha} \delta \right) - [t\omega + (1 - t)\bar{\omega}] \frac{\beta}{\alpha} y + \psi = \xi + \psi$$

With (ξ) as the primary deficit-to-capital stock ratio, and (ψ) as the costs of debt servicing over the capital stock.

Finally, equations (15) formalizes in the simplest way possible how the interest rate on government bonds is determined on the financial and credit market.

¹³ In our model, commercial banks do not ration financed project by changing the position of the effective demand for credit on the credit market, but by moving along the effect demand for credit by fixing a higher interest rate on available credit.

¹⁴ Alternatively, one can also interpret such a mark-up rate (μ) as the natural spread dividing interest rates on riskier assets (i.e. private loans) from those charged on safer ones (i.e. government bonds).

$$(15) i_d = i + \sigma(b, \Omega)$$

With:

$$\sigma > 0 \text{ and } (\partial\sigma/\partial b) > 0 \text{ if } \Omega = 1;$$

$$\sigma = 0 \text{ and } (\partial\sigma/\partial b) = 0 \text{ if } \Omega = 0$$

Given the supply of new bonds given by public sector financing needs, bids for bonds by domestic commercial banks and foreign investors depend on the perceived degree of soundness of public finances, and the level of safety of the corresponding financial liabilities. In turn, the riskiness of government bonds likely relies upon the ‘monetary framework’ in which government bonds are issued. Following De Grauwe (2011), monetarily sovereign countries issue bonds denominated in their own currency, which is in turn controlled by the corresponding central bank. Even more importantly, the central bank will likely intervene any time it likes on financial market and buy government bonds in order to prevent default risks to emerge. Accordingly, in monetarily sovereign countries, government bonds are usually considered as risk-free assets. Of course, this is not the case of Eurozone economies. Indeed, Eurozone governments issue bonds denominated in a foreign *supranational* currency outside their own (direct or indirect) control. On top of this, Eurozone rules impose national governments to find resources on private financial markets only, and forbid the ECB from buying public bonds (at least on the primary market). In a way, the solidity of Eurozone national finances is in the hands of financial operators’ will. Accordingly, financial operators perceive Eurozone governments’ bonds as potentially riskier assets.

Consistently with these arguments, in equation (15) the interest rate on government bonds is established by financial markets’ behavior according to the UIP. In equation (15), (*i*) stands for the interest rate on risk-free assets. Parameter (σ) represents a specific country factor risk. It jointly depends on the state of public finances, and on country-specific ‘monetary institutions’ arrangements’. In particular, we assume σ to depend positively on the public deficit-to-GDP ratio $b=(\xi+\psi)/\beta y$ ¹⁵. The higher is b , the higher will be the interest rate national governments will have to pay on issued public bonds. This relationship, however, holds true only in the case of non-monetarily sovereign economies, i.e. when the bivariate ‘institutional variable’ Ω is equal to 1. Following De Grauwe and Ji (2013), in the case of monetarily sovereign economies, i.e. when $\Omega=0$, this relationship breaks down, and government bonds yields get insensitive to economic fundamentals such as the fiscal policy stance (read public deficit), the growth rate of the economy, and its net external investment position¹⁶. Accordingly, government bonds get the ‘status’ of risk-free assets, and the corresponding interest rate is exogenously set equal to (*i*).

¹⁵ In this model, we assume the interest rate i_d to be a (positive) function of public *deficit*-to-GDP ratio only, and not of the *debt*-to-GDP ratio. This is, of course, a simplifying assumption. Yet, whilst it makes mathematical passages more tractable, it does not change the meaning or the results of our analysis. This assumption will be relaxed in the long-run analysis performed in the second part of the paper.

¹⁶ De Grauwe and Ji (2013) stress that “[in the case of “stand-alone” economies] financial markets do not seem to be concerned with the size of the government debt and of the fiscal space [...] despite the fact that the variation of these ratios is of a similar order of magnitude as the one observed in the Eurozone (De Grauwe and Ji, 2013, p. 24)”.

2.2 The short-run macroeconomic effects of public transfers' cuts

The supporters of the expansionary austerity stress that *well-designed* fiscal consolidations must take the form of deep, persistent and credible cuts in public expenditures, in particular public transfers and public employees' wages, perhaps followed by reductions in the tax burden on households. In their view, such a shift in fiscal policy may constitute a 'regime change' that can immediately foster economic activity through three main mechanisms. First, successful fiscal corrections can positively affect the behavior of private economic actors, both households and firms, through the so-called 'expectation channel'. Upfront public spending cuts, it is argued, may induce economic agents to elaborate optimistic expectations by anticipating future tax reductions and consequent increases in their own (permanent) income. This, in turn, may incentivize them to immediately raise consumption and to unleash new investments, giving momentum to current economic activity. Second, tough fiscal corrections that prove to be effective in reducing public deficit and public debt stock can stimulate investments and growth by re-establishing bond vigilantes' trust in public finances' solvency and prompting a significant reduction in interest rates. Finally, cuts in public wages can foster exports by establishing a climate of wage moderation on the labor market, hence engineering an internal and external devaluation.

In our theoretical framework, equation (16) defines the level of capacity utilization y that ensures the equilibrium in the goods market:

$$(16) \quad y = \frac{(1-s)(1-t)\eta(q)\left(\bar{\omega}\frac{\beta}{\alpha} + \rho\right) + \gamma + g(y^e, i_H) + \epsilon q}{\left[\beta - (1-s)(1-t)\eta\frac{\beta}{\alpha}(\omega - \bar{\omega})\right]}$$

More than that, equation (16) represents the crucial economic relation through which we can theoretically inquire the effectiveness of well-designed austerity packages to prompt economic recovery in the short-run.

In order to perform such analysis, let first assume the government to implement a restrictive fiscal adjustment such that the cyclically adjusted primary deficit over GDP decreases by an amount equal to $-\theta$. Also assume that fiscal consolidation mainly consists in cuts to public transfers (i.e. $dTr^G < 0$). In terms of our model, once defined the CAPB-to-GDP ratio as $b^* = \frac{1}{\beta} \left[\gamma + (1-t) \left(\rho + \bar{\omega} \frac{\beta}{\alpha} \delta \right) - [t\omega + (1-t)\bar{\omega}] \frac{\beta}{\alpha} \right]$, we get:

$$(17) \quad db^* = -\theta = \frac{(1-t)}{\beta} d\rho = \frac{(1-t)}{\beta p^H K} dTr^G, \text{ so that: } dTr^G = -\frac{Y^*}{(1-t)} \theta$$

With $\theta > 0$.

In our model, such a fiscal adjustment has a direct and simultaneous short-run effect on both current capacity utilization y and b . Totally differentiating y and b , and taking into account the sign of equation (17), we get a system of two simultaneous equations for dy and db :

$$(S.1) \begin{cases} dy = \frac{-[f_{t^e}(1-t)\eta(\bar{\omega}\frac{\beta}{\alpha}+\rho)dt^e - f_{TrG}\eta(\bar{\omega}\frac{\beta}{\alpha}+\rho)Y^*\theta] - (1-s)\eta Y^*\theta - g_{i_H}(1+\mu)\sigma_b db}{[\beta - (1-s)(1-t)\eta\frac{\beta}{\alpha}(\omega - \bar{\omega})]} \\ db = -\frac{Y^*\theta}{\beta y} - [t\omega + (1-t)\bar{\omega} + b] \frac{dy}{y} \end{cases}$$

With $f_{t^e} > 0$; $f_{TrG} < 0$; $(\sigma_b|\Omega) \geq 0$; $dt^e < 0$

Equations (18) and (19) give the solutions dy^S and db^S of system (S.1):

$$(18) dy^S = \frac{\overbrace{[f_{t^e}(1-t)\eta(\bar{\omega}\frac{\beta}{\alpha}+\rho)]}^{+ \text{ or } 0} |dt^e| - \overbrace{[(1-s) - f_{TrG}(\bar{\omega}\frac{\beta}{\alpha}+\rho)]}^{-} \eta Y^*\theta + \overbrace{g_{i_H}(1+\mu)\frac{Y^*}{\beta y}\sigma_b\theta}^{+ \text{ or } 0}}{\{[\beta - (1-s)(1-t)\eta\frac{\beta}{\alpha}(\omega - \bar{\omega})] - g_{i_H}(1+\mu)\sigma_b[\frac{t\omega + (1-t)\bar{\omega} + b}{y}]\}}$$

$$(19) db^S = -\frac{Y^*\theta}{\beta y} - [t\omega + (1-t)\bar{\omega} + b] \frac{dy^S}{y}$$

What emerges from equations (18) and (19) is that there is not any clear outcome of fiscal austerity. Indeed, the sign of equation (18) may be positive, confirming the expansionary austerity hypothesis, or negative, in line with the traditional Keynesian concern about the recessionary effects of fiscal retrenchments. The same applies to equation (19). Public transfers' cuts might help reducing public deficit over GDP or, alternatively, they may be counterproductive and lead to an even higher deficit-to-GDP ratio in the event they would trigger a tough economic contraction. In the end, the introduction in our model of expansionary austerity-like assumptions, and the detailed formalization of what is considered a *well-designed* austerity package, does not guarantee at all austerity measures to be effective.

Despite such indeterminacy, some worrisome points are worth stressing. First, the expansionary outcome of fiscal adjustments heavily depends on the intensity of partial derivative f_{t^e} , and of $|dt^e|$, i.e. the expected reduction in the tax rate levied on households. The higher and the quicker is $|dt^e|$, the more rapidly and robustly private consumption may respond positively to public budget's cuts. Interestingly, and perhaps paradoxically, it is reasonable to think that such positive expectations will hardly materialize in an economy characterized by a high public debt stock, i.e. the economic scenario in which, according to EAT supporters, fiscal consolidation is primarily needed. Indeed, when public debt D is considerably high and a prolonged period of fiscal consolidation is foreseen, a high degree of uncertainty may 'surround' the extent and the timing of future tax cuts (at least with respect to current certain spending cuts). In such a context, the 'expectation channel' is extremely weak at best, and likely more than compensated by the overwhelming contractionary effect of current public transfers' cuts.

Second, public transfers' cuts, expansionary austerity proponents say, can boost growth by reducing public deficit, hence interest rate i_d on public bonds and, above all, interest rate i_H on banks' loans to the private sector. Such a reduction in the cost of external borrowing may in fact spur private investment, and induce the economy to expand. According to our model, however, such an effect of fiscal adjustments on interest rates does not take place in monetarily sovereign economies. Following equations (13) and (15),

in the case of monetarily sovereign countries, the ‘financial market channel’ seems to be irrelevant (i.e. $\sigma_b=0$), and the allegedly expansionary impact of fiscal consolidation turns out to be even more questionable.

The ‘financial market channel’ might be at work in the case of eurozone countries that issue public bonds denominated in a supranational currency, and in which the solidity of public finances hinge upon financial markets’ sentiments. In such a context, one could be persuaded that front-loaded fiscal adjustments might reassure financial markets about the sustainability of eurozone countries’ fiscal positions, and thus create a favorable economic environment for growth. This logic may hold true if fiscal adjustments effectively put fiscal variables under control. Yet, we are very far from taking such an outcome of fiscal consolidation as guaranteed. Indeed, recent empirical evidence shows that it is hard to find a way out from public balance disarrays without sustained growth (Ali Abbas et al., 2013), and that fiscal multipliers may be high and positive when economies are in the midst of a recession (Batini et al., 2012; Baum et al., 2012; Qazizada and Stockhammer, 2015). If so, severe and perhaps premature fiscal retrenchments may actually induce a short-run deterioration in fiscal variables by jeopardizing growth (see Ali Abbas et al., 2013).

More formally, let assume an economy in which (a) the ‘credibility channel’ is strong, and financial operators overreact to changes in public deficits (i.e. $\sigma_b \gg 0$); (b) improvements in public balance are over-dependent on changes in economic activity (i.e. $((t\omega + (1 - t)\bar{\omega} + b)/y \gg 0)$). In such a scenario, the denominator of equation (18) likely turns out to be negative. Despite discretionary budget cuts could per se reduce public deficits, even a small contraction in economic activity eventually makes public disarrays deeper instead of smaller. Financial operators get even more frightened by worsening public finance conditions, and interest rates skyrocket. Economic recession gets deeper and gives rise to an endless ‘race to the bottom’ (see Figure 1), which will inevitably end up in a public debt default, and in a tremendously painful crisis. This kind of dynamics may sadly resemble that one observed in Greece since 2010. The message to policy-makers is: in the context of non-monetarily sovereign countries, in which the ‘financial channel’ is judged to be relevant to stabilize real and financial variables, it is of paramount importance to assess the effectiveness of austerity packages to prompt quick recoveries before implementing them. If even a mild recession is like to come, austerity measures may give rise to a financial disaster rather than consolidating public finances.

[Figure 1 here]

Finally, since mid-2012, financial speculation on peripheral Eurozone countries’ bonds has calmed down thanks to the well-known Mario Draghi’s ‘whatever it takes’ pledge. Interest rates i_d have decreased significantly. They are currently at historically minimum levels. In such a context, it makes sense to question the effectiveness of the ‘financial channel’. As Roberto Perotti himself stresses, “if fiscal consolidations were expansionary in the past because they caused a steep decline in interest rates or inflation, it is unlikely that the same mechanism can be relied on in the present circumstances, with low inflation and interest rates close to zero (Perotti, 2012, p.309)”.

2.2 The short-run macroeconomic effects of lower unemployment benefits

An additional proposition of the EAT is that fiscal adjustments should also aim at reforming the labor market, directly or indirectly. For instance, cuts in unemployment benefits \bar{w} may induce wage moderation. This, in turn, may improve the external competitiveness of the economy and boost growth via rising exports and lower imports. In our model, system (S.2) captures the short-run effects of such additional fiscal austerity measure:

$$(S.2) \left\{ \begin{array}{l} dy = \frac{\overbrace{(1-s)(1-t)\eta(\beta/\alpha)[(1-y)\bar{\omega} + \omega y \varepsilon_{w,\bar{w}}]} + \overbrace{(\eta_q \Gamma + \epsilon)(\partial q / \partial w)(\partial w / \partial \bar{w})d\bar{w}} + \overbrace{-g_{iH}(1+\mu)\sigma_b db}}}{[\beta - (1-s)(1-t)\eta \frac{\beta}{\alpha}(\omega - \bar{\omega})]} \\ db = \frac{\beta}{\alpha} [(1-t)(\delta - y)\bar{\omega} + ty\omega \varepsilon_{w,\bar{w}}] \frac{d\bar{w}}{\bar{w}} - [t\omega + (1-t)\bar{\omega} + b] \frac{dy}{y} \end{array} \right.$$

With $\Gamma = (1-s)(1-t) \left\{ \frac{\beta}{\alpha} [\bar{\omega} + (\omega - \bar{\omega})y] + \rho \right\}$; $(\partial w / \partial \bar{w}) > 0$ and $\varepsilon_{w,\bar{w}}$ as the elasticity of nominal wages w to the unemployment subsidy \bar{w} ; $(\partial q / \partial w) < 0$; $d\bar{w} < 0$.

Equations (20) and (21) give the solutions of system (S.2):

$$(20) dy^{S2} = \frac{\overbrace{(1-s)(1-t)\eta(\beta/\alpha)[(1-y)\bar{\omega} + \omega y \varepsilon_{w,\bar{w}}] + (\eta_q \Gamma + \epsilon)(\partial q / \partial w)(\partial w / \partial \bar{w})d\bar{w} - g_{iH}(1+\mu)\sigma_b(\beta/\alpha)[(1-t)(\delta - y)\bar{\omega} + ty\omega \varepsilon_{w,\bar{w}}]}^?}{\{[\beta - (1-s)(1-t)\eta \frac{\beta}{\alpha}(\omega - \bar{\omega})] - g_{iH}(1+\mu)\sigma_b[t\omega + (1-t)\bar{\omega} + b]/y\}} d\bar{w}$$

$$(21) db^{S2} = \frac{\beta}{\alpha} [(1-t)(\delta - y)\bar{\omega} + ty\omega \varepsilon_{w,\bar{w}}] \frac{d\bar{w}}{\bar{w}} - [t\omega + (1-t)\bar{\omega} + b] dy^{S2}$$

Once again, it is evident than no clear-cut solutions exist, and that the theoretical basis of the EA doctrine is extremely weak. In particular, when the direct and indirect effects (i.e. the decrease in monetary wages w) of cuts in unemployment benefits are taken into account, the immediate outcome of such measures is a lower demand injection (i.e. lower consumption). This would certainly deepen a recession instead of prompting recovery. Of course, the contraction in domestic consumption might well be compensated by rising exports (and lower imports) as boosted (discouraged) by a lower domestic nominal wages w , and thus, *ceteris paribus*, by a depreciated real exchange rate q . However, increasing net exports and, possibly, booming economic activity, strongly rely upon the sensitiveness of net exports to the real exchange rate (i.e. parameters ϵ and η_q in equation (20)), which in turn is conditional to the sectorial composition of net exports themselves and to the degree of openness of the economy (see Taylor, 1991). It is perhaps not by chance that one of the most cited examples of successful expansionary austerity is that one taking place in Ireland in late 1980s. Ireland is now a small open economy that is highly integrated on international goods markets, and that exports a restricted but highly dynamic variety of manufactured products. At the end of the 1980s, Irish exports were already accounting for more than 50 percent of Irish GDP. A fundamental pillar of the late 1980s Irish economic rebound was the solid expansion of Irish exports also due to a significant initial one-shot devaluation of the Irish pound (Perotti, 2012). At least in the case of Eurozone countries, such a policy recipe is not available any longer. On top of this, it is questionable whether a *relatively closed and largely de-industrialized* small country like Greece could currently

follow a similar recovery strategy. There are good reasons to believe that EAT-sponsored internal devaluation in Greece would give rise to opposite results with respects those wage moderation supposedly generated in Ireland when it was combined with other no-more available policy options, and when it was implemented in a much more favorable domestic and international economic scenario.

3. The long-run dynamics

Even admitting that austerity measures may imply some costs in the short-run, the supporters of expansionary austerity nevertheless claim that well-designed fiscal consolidations can pave the way for much higher benefits in the medium-to-long run. These benefits are supposed to emerge form the allegedly safer macroeconomic environment austerity could lead to by putting public finances under control.

In order to critically enquire such proposition, let analyze the dynamics of some relevant economic variables. Take price dynamics first. On the basis of equations (5) - (6), let assume for the sake of simplicity that workers ground their price expectations on domestic prices only, so that $P^e=(P^H)^e$. Even further, let assume that both the targeted real wage by trade unions, and the desired profit rate by non-financial firms are exogenous and do not change through time. Consistently with these assumptions, trade unions modify their (nominal) wage claims should any gap be registered, ex-post, between expected prices and effective ones (i.e. should their targeted wage share be inconsistent with that one eventually determined by the price-setting decisions of non-financial firms)¹⁷. More formally (with ‘hat variables’ representing percentage variations):

$$(22) \hat{w} = \frac{P^H - P^e}{P^e} = [(1 + m(r^d/y^e)(1 - \tau_w) - 1]$$

Non-financial firms may decide to change their mark-up if their expectations about capacity utilization, and hence their targeted profit rate, are not fulfilled. In particular, we could write:

$$(23) (\widehat{1+m}) = \tau\hat{m} = \tau\vartheta(\tau y^e - \tau y) = \tau^2\vartheta(y^e - y)$$

In equation (23), ϑ stands for the extent by which non-financial firms adjust their mark-up rate (m) as a consequence of unrealized expectations. Non-financial firms may increase their mark-up rate (m) in the attempt to raise profitability from unsatisfactory low levels as due to an effective capacity utilization lower than the expected one (i.e. $y^e > y$). Alternatively, firms may be satisfied of a perhaps slightly lower mark-up rate should economic activity be buoyant and competitive pressures increasing¹⁸. Equation (24) defines domestic price inflation by combining equations (22) and (23):

¹⁷ It is easy to verify that the condition $P^H=(P^H)^e$ implies $(1 + m)(1 - \tau_w) = 1$, hence $(1 - \tau_w) = \frac{1}{1+m} = (1 - \tau)$, where $(1 - \tau)$ is workers’ wage share effectively emerging in the economy once firms have set prices according to their expectations and desired profit rate.

¹⁸ See Taylor (2004, ch.3) for a review of the literature assuming the mark-up rate to be a negative function of capacity utilization.

$$(24) \widehat{P}^H = \tau^2 \vartheta (y^e - y) + [(1 + m(r^d/y^e)(1 - \tau_w) - 1]$$

In the EA theoretical building, the formation and the evolution of expectations play a crucial role for austerity packages to be expansionary. In the EAT, expectations' formation follows a standard forward-looking perfect foresight logic as elaborated by fully rational economic actors. Such a theoretical apparatus significantly downgrades the degree of uncertainty affecting economic actors' decisions. It excludes by assumption the systemic risks, and the occurrence of long-lasting periods of economic depression/stagnation possibly triggered off by financial crises and public debt defaults.

The theoretical infrastructure just described seems quite unrealistic and incapable to represent the worldwide economic scenario emerging in the aftermath of the 2007-2008 financial meltdown. For sure, it is unsuitable to describe the climate of economic and political havoc characterizing the Eurozone since the beginning of 2010. In the last five years, economic decisions in the Eurozone have been taken in a condition of deep *substantive* and *procedural* uncertainty (Dosi and Egidi, 1991). First, economic actors did not dispose of clear information about the real solidity of member states' public finances, and about the extraordinary policy measures recurrently announced to restore fiscal soundness. Second, they did not know how to elaborate such information in light of the spreading pessimism about eurozone survival. Given the ensuing climate of radical uncertainty, the best economic actors could (can) do was to elaborate expectations in a myopic fashion. This is formally stated in equation (25), which models how non-financial firms' expectations evolve:

$$(25) \widehat{y}^e = \phi(y - y^e) = \phi(y(y^e, \lambda) - y^e)$$

Non-financial firms revise upward their expected level of capacity utilization, and hence set $\widehat{y}^e > 0$, when *current* capacity utilization (y) turns out to be higher than the *expected* one. On the contrary, should effective capacity utilization fall smaller than expected, expectations will be updated downward.

Two different stability scenarios may characterize expectations' dynamics. On the one hand, a self-stabilizing adjustment process prevails if current economic activity, via desired investments, does not overreact to changes in expectations. Mathematically, this scenario takes place if $(\partial \widehat{y}^e / \partial y^e) < 0$, i.e. if the following condition $\frac{g_{y^e}}{[\beta - (1-s)(1-t)\eta_\alpha^\beta(\omega - \bar{\omega})]} < 1$ is fulfilled.

On the other hand, should $\frac{g_{y^e}}{[\beta - (1-s)(1-t)\eta_\alpha^\beta(\omega - \bar{\omega})]}$ be greater than 1, and $(\partial \widehat{y}^e / \partial y^e) > 0$, exuberant (over-depressed) investment decisions will respond to improving (worsening) expectations. In this event, the revision of expectation would be characterized by an unstable knife-edge Harrodian dynamics.

With respect to the short-run model described above, in equation (25) we introduction an additional EAT-like assumption. Following the arguments put forward by Reinhart and Rogoff (2010), we assume that, on top of a higher deficit-to-GDP ratio, an increasing debt-to-GDP ratio $\lambda = D/P^HY$ can also have a negative impact on economic activity. In the specific case of non-monetarily sovereign countries, in particular, a higher and *supposedly riskier* public debt stock may negatively impact on commercial banks' balance sheets due to decreasing prices of sovereign bonds. This may in turn lead commercial banks to search for

higher ‘safety’ margins on fundable projects and revise upward the mark-up rate μ . *Ceteris paribus*, commercial banks will charge higher interest rates i_H on loans to the private sector. Widespread turbulences on the market for sovereign bonds may materialize together with a private banks’ crisis and a credit crunch on the market for private sectors’ loans. Eventually, all these tightly entangled events may entail harsh effects on economic activity, and possibly drive the economy in a recession.

The debt-to-GDP ratio is commonly considered as a variable of paramount importance to assess the long-run sustainability of public finances. Equation (26) describes the dynamics of the debt-to-GDP ratio λ . After some mathematical passages, we get:

$$(26) \left(\frac{\widehat{D}}{\widehat{P^H Y}} \right) = \hat{\lambda} = \frac{dD}{D} - \widehat{P^H} - \widehat{Y} = \frac{(\xi+\psi)/\beta y}{\lambda} - \widehat{P^H} - \hat{y} - \widehat{K} =$$

$$\hat{\lambda} = \frac{\xi(y(y^e)/\beta y(y^e))}{\lambda} + \frac{\psi(\lambda)/\beta y(y^e)}{\lambda} - \{ \varepsilon_{y,y^e} \widehat{y^e} + \varepsilon_{y,i_H} \widehat{i_H}(\lambda) - (1 - \varepsilon_{y,q}) \widehat{P^H}(y^e) - g(y^e, i_H) \}$$

In equation (26), $\varepsilon_{y,y^e} = (g_{y^e} y^e / y(y^e, i_H))$ is the elasticity of *current* capacity utilization y to the *expected* one y^e , whilst $\varepsilon_{y,i_H} = g_{i_H} i_H / y(y^e, i_H)$ is y ’s elasticity to the interest rate i_H . Finally, $\varepsilon_{y,q}$ is y ’s elasticity to the real exchange rate. For the sake of simplicity, in equation (26), we assume that both the nominal exchange rate (e) and foreign prices (P^F) do not change. Accordingly, the dynamics of the real exchange rate (q) boils down to the percentage variation in the price of the domestic good.

As to the stability properties of the debt-to-GDP ratio, it is first of all reasonable to think that higher firms’ expectations y^e , and hence higher current economic activity y and investment flows \widehat{K} , contribute to reduce and stabilize λ .

The effects that λ may display on its own dynamics are trickier. Following Botta (2013), at relatively low levels of the debt-to-GDP ratio, a slightly higher value of the state variable λ makes any additional public deficit less relevant in percentage terms. Accordingly, in equation (26) \widehat{D} turns out to be smaller and the debt-to-GDP ratio under control. However, at much higher values of the debt stock, some of the concerns of the supporters of the EAT may materialize. On the one hand, the higher is λ , the higher will be the burden of debt payments over GDP ψ ¹⁹. On the other hand, $\widehat{i_H}$ may respond positively to high and increasing debt-to-GDP ratios, due to the abovementioned intertwined dynamics between λ and the interest rate on loans to the private sector. In the end, when financial operators start to fear, rationally or not, that λ has reached excessively high levels, destabilizing forces may set in passing by increasingly cumbersome repayment commitments, and the perverse effects supposedly unsafe public finances may induce on interest rates and economic activity²⁰.

¹⁹ This effect comes both as a natural consequence of a higher debt stock, as well as a consequence of financial operators’ assessments of the financial risks characterizing highly indebted economies. Again, in particular in the case of non-monetary sovereign countries, the accumulation of an increasing public debt stock can easily induce financial operators to raise the country factor risk σ , ask for higher interest rates i_d , and eventually make repayment conditions more stringent.

²⁰ In the analysis of equation (26), we have assumed that price dynamics and the evolution of the real exchange mutually compensate each other (i.e. $\varepsilon_{y,q} = 1$). On the one hand, higher inflation reduces the real burden of the public debt stock. On the other hand, it may raise λ by appreciating q , jeopardizing net exports, and eventually inducing a contractionary effect on current economic activity. For the sake of simplicity, we neglect to explicitly consider the direct and indirect effects $\widehat{P^H}$ may play on $(\hat{\lambda})$.

Equations (25) and (26) jointly define an evolving economic system, in which a variety of different trajectories may emerge and define the joint dynamics of fiscal variables and economic activity. Figures 2 and 3 graphically describe (part of) such dynamics in the $(y^e - \lambda)$ space. According to the analysis developed above, the locus for a constant debt-to-GDP ratio ($\hat{\lambda}=0$) may take the form of a U-shaped curve. In this sense, λ_T stands for the dividing threshold of the debt-to-GDP ratio, above which financial operators believe destabilizing forces will mount. From a graphical point of view, it represents the turning point after which the upward sloping arm of the locus for ($\hat{\lambda}=0$) emerges. In Figure 2, we describe the case of self-stabilizing forces to prevail in ‘shaping’ expectations’ dynamics. Hence, the locus for ($\widehat{y^e} = 0$) slopes downward. In Figure 3, we portray the case for self-induced instability characterizing expectations’ dynamics. Accordingly, the locus for ($\widehat{y^e} = 0$) is positively sloped. In Figures 2 and 3, the vertical dashed line ‘ λ_{max} ’ stands for the ceiling value of the debt-to-GDP ratio financial operators would accept to finance before rejecting additional treasury bond issuances and giving rise to public bankruptcy. Similarly, the horizontal dashed line represents the technology-bounded (highest) level expected and effective capacity utilization can reach.

[Figure 2 here]

[Figure 3 here]

Under certain parametric conditions, the system we describe is much far away from displaying the unique and stable equilibrium that usually characterizes EAT-like mainstream models populated by fully rational perfect-foresighted agents (see Bertola and Drazen, 1990; Barry and Devereux, 2003). In our model, path-dependence, cumulative mechanisms and multiple equilibria dominate the scene²¹. In Figure 2, for instance, point *A* represents a *locally stable* equilibrium featuring a relatively high level of capacity utilization and a low debt-to-GDP ratio. Nevertheless, point *B* is a ‘perverse’ *unstable* equilibrium, which combines low capacity utilization with a burdensome debt stock. On the right-hand side of point *B*, worrisome cumulative mechanisms get momentum. They can move the economy towards point *C*. In point *C*, financial markets eventually repudiate sovereign bonds, and public debt default takes place. The economic activity collapses.

Such destabilizing forces are even stronger in Figure 3. In this case, despite of a relatively low debt-to-GDP level, even point *A* shows saddle-path instability. In the absence of perfect-foresighted and optimizing agents, any even small deviation from point *A* triggers off diverging dynamics. In an optimistic scenario, a booming economic activity could go hand-in-hand with a monotonically decreasing debt stock. However, the economy may alternatively enter a far more worrisome path, along which collapsing expectations and economic activity mutually feedback with an exploding and eventually defaulting debt burden.

²¹ The condition for multiple equilibria to exist requires $\left| \frac{(\partial \lambda / \partial \lambda)}{(\partial \lambda / \partial y^e)} \right|_{\hat{\lambda}=0} > \left| \frac{(\partial \phi / \partial \lambda)}{(\partial \phi / \partial y^e)} \right|_{\phi=0}$ when λ tends towards zero. This condition is likely to fulfil if we reasonably assume that the EAT-like negative effect the debt-to-GDP ratio λ may carry out on effective capacity utilization, and hence on the dynamics of expectations, is close to zero and negligible at low levels of the debt-to-GDP ratio itself.

3.1 Short-run costs with long-run benefits? The intrinsic long-run inconsistency of EAT

Given the above scenarios, may well-designed austerity packages be a bitter medicine against fiscal indiscipline in the short run, but revitalizing the economy in the long run?

Let assume that the government implements a drastic and permanent cut in public transfers and/or social service provisions (i.e. ρ and $\hat{\omega}$ decrease in equation (16)). As some recent contributions in the EAT vein themselves admit, let assume these measures curtail economic activity in the short-run. If so, in Figure 4 such a contractionary fiscal policy shock shifts the isocline for $(\hat{\lambda} = 0)$ upward. At the same time, the isocline for $(\hat{y}^e = 0)$ moves downward. In Figure 4, it turns out to be clear that the long-run consequences of an austerity-led short-term recession are radically at odds with the EAT prospected achievements. Should the economy be initially located in equilibrium point A , it will eventually end up in equilibrium A_2 , featuring both a depressed expected and effective economic activity (at least with respect to that associated to the initial equilibrium), and an increased debt burden. Even more worrisome, should the economy be located in equilibrium B , an endless crisis and a mounting unsustainable debt stock will eventually bring the economy towards an inevitable default (point B_2 in Figure 4).

Such undesirable long-run outcomes of short-term austerity-led contractions would arise even more easily in the radically unstable macroeconomic environment described in Figure 3. In such a scenario, long-run instability would emerge even with an economy originally located in the apparently safe low-debt equilibrium A . Due to economic actors' expectations overreacting to fiscal policy shocks, even a slight upward shift in the isoclines for constant values of λ and y^e (see Figure 5) will eventually induce a permanent contraction in economic activity and an unsustainable public debt-to-GDP ratio to emerge.

[Figure 4 here]

[Figure 5 here]

More in general, the economy we describe, or at least some relevant economic variables, may display explosive cumulative dynamics. This is the case of the debt-to-GDP ratio when government bonds are issued by non-monetarily sovereign countries, public debt sustainability is in the hands of financial market operators, and λ eventually exceeds the stability thresholds financial operators have adopted as shared but fragile convention. These non-linear, possibly cumulative dynamics are source of path-dependence and multiple trajectories. A common aspect of these trajectories is that short-run austerity-led costs cause even stronger pains rather than benefits in the long run. In the context of overreacting expectations and/or highly indebted economies, they risk to make the macroeconomy more vulnerable and unstable, rather than safer and more solid. This is why “a radical solution for high debt is [may be] to do nothing at all— [and] just live with it (Ostry and Gosh, 2015)”, at least when we come to consider tough fiscal retrenchments as an option to tackle with it. Other way around, short-run costs and long-run benefits of austerity measures are mutually inconsistent. Even in a theoretical framework that takes on board some crucial EAT assumptions, austerity *must be expansionary* in the short run in order to pay off in the long run. Unfortunately, we have seen at length how the former events, i.e. short-run austerity-led expansions, are very unlikely to happen, and to pave the way for the latter.

3.2 *The case for endogenous monetary institutions*

In our model, country-specific institutions contribute to determine the short- and long-run outcome of fiscal shocks. More in details, the specific rules guiding central bank flexibility in purchasing government bonds and taking action against financial distress crucially modify how austerity may affect economic activity, the public deficit, and the public debt.

In the short run, the degree of monetary sovereignty of an economy contributes to define which channel is active, through which fiscal consolidation might deliver expansionary outcomes. In monetarily sovereign countries, the central bank can easily buy government bonds in order to backstop any extraordinary fiscal effort against economic and financial crises. This is why it is common belief that “Sovereigns do not default (Kregel, 2012, p.3)”. This is also why bonds issued by monetarily sovereign countries are perceived as risk-free assets, and safe shelter where financial operators store funds in times mounting uncertainty. According to these facts, the ‘financial channel’ through which austerity might hypothetically boost growth is not at work in monetarily sovereign economies. Such channel may be operative in non-monetarily sovereign eurozone member states. However, its effectiveness is contingent to the highly debatable capacity of austerity measures to prompt expansions and squeeze public deficits (and debts) from the very onset.

The degree of monetary sovereignty can fundamentally alter the long-run stability of the economy. In monetarily sovereign countries, the domestic central bank can promptly neutralize the negative effects that an increasing debt-to-GDP ratio may display on financial and credit markets. In terms of our model, this implies eliminating, or at least taming, the explosive consequences that a too high debt stock may induce on its own dynamics (via ψ and \hat{v}_H) once it has overcome the stability threshold λ_T . Graphically (see Figure 2), this amounts to remove the upward sloping part of the locus for ($\hat{\lambda} = 0$), or at least make it emerge at a far higher value of the debt-to-GDP ratio, and with a much flatter slope. In sum, full monetary sovereignty can significantly expand the safe area (say the stability zone surrounding point *A* in Figure 2) financial operators may bear in mind, and impede destabilizing circles to originate. By the same token, the lack of monetary sovereignty constitutes a fundamental source of financial fragility, as the Eurozone experience in the immediate aftermath of the worldwide financial crisis sadly witnesses.

In this model, we presented such an institutional dichotomy as exogenously given, and captured by the binary time-invariant parameter Ω . Nonetheless, the events taking place in the Eurozone since 2012 demonstrate that institutions, monetary institutions among them, can also *co-evolve* through time together with ‘pure’ economic variables. The 2007-2008 financial crisis initially emerged as an external shock to euro countries. Due to the peculiar features or, better, the shortcomings of the eurozone institutional building, a private debt crisis evolved into an even worse sovereign debt crisis. The inability of the euro system to deal with this problem, and actually the increasing risk of a eurozone suicide, eventually induced the ECB to pursue a gradual, partial, yet important drift towards an embryonic (and path-dependent) form of monetary sovereignty²². In the end, the ‘whatever it takes’

²² Path-dependency here emerges from the perhaps unusual and original institutional arrangements the euro system adopted in 2012 in order to definitively snap off financial turbulences, given the existing (legal and political) constraints to the goals the ECB should pursue, the actions it could take, and the lack of a eurozone centralised fiscal authority.

statement by Mario Draghi, and the launch of the OMT program, may constitute good examples of *endogenous structural* (say *institutional*) *changes* (Lordon, 1997) inspired by the intrinsic dynamics of the system, and by the very same economic issues they aim to tackle with.

The effects of such a change are well known. Previous hikes in the interest rates of sovereign bonds issued by peripheral eurozone countries have literally disappeared. Since mid 2012, interest rates on public debt have constantly decreased, now reaching historically minimum levels. Financial operators have stopped to obsessively scrutinize the solidity of public finances of peripheral countries. In terms of our model, Figure 6 portrays the stabilizing forces sparked in the Eurozone by the so-called ‘Draghi put’.

[Figure 6 here]

Let assume that the worldwide ‘Great Recession’ and the rescue packages of domestic financial institutions cause public deficits and public debts to suddenly rise. Let also assume that debt-to-GDP ratios overcome the stability threshold λ_T , which financial operators fix at relatively low levels in the specific case of (non-monetarily sovereign) eurozone countries. In the absence of any significant change, financial turbulences would mount and peripheral eurozone countries find themselves stuck on the verge of bankruptcy (as effectively happened). The extraordinary measures taken by the ECB board at the height of the crisis represent the endogenous response of the system to such apparently inevitable end. In Figure 6, the upward-sloping arm of the locus for ($\hat{\lambda} = 0$) moves downward and changes slopes. The isocline for constant values of the debt-to-GDP ratio λ gets transformed in a prevalently downward-sloping locus. Point B shifts to point B' ; the destabilizing forces on the right of point B are inverted into stabilizing ones (see newly emerging red arrows). The economies that were desperately reining against a seemingly unavoidable default, can now rejoin stability, and (perhaps gradually) converge back to point A.

4. Conclusions

An increasing body of literature admits that front-loaded fiscal retrenchments can likely cause an economic recession and an increasing debt-to-GDP ratio (Gros, 2012; Ali Abbas *et al.*, 2013; Warmedinger *et al.*, 2015) in the short run. The short-run version of our models shows this concern to be well grounded. Nonetheless, the above literature describes recession and rising debt-to-GDP ratios as the necessary costs to support in the short run in order to reap much higher benefits in the long run. In this paper, we show how this proposition is theoretically inconsistent. In order to pay off in the long run, austerity *must* be expansionary and debt reducing from the very onset. Unfortunately, economists and policy-makers alike are increasingly skeptical this event will ever materialize.

In light of these findings, the right policy recipe against the sovereign debt crisis, and the right timing to implement it, look like radically different from what effectively done so far in the Eurozone. In the case of highly indebted non-monetarily sovereign economies like Greece, in the absence of any radical institutional change, macroeconomic stability and growth can be primarily achieved through a significant debt relief. Alternatively, monetary institutions should immediately adopt the decisive step-in the ECB too late

announced in July 2012. This would give to national governments more space of maneuver to gradually and less painfully reform their economies in a much more stable environment. Only subsequently some mild austerity measures could be considered in those (few) countries effectively dealing with some problems of fiscal profligacy.

Following Eichengreen and Panizza (2014), too ambitious and prolonged adjustment programs are hardly implementable. They also fail to recognize that significant reductions in the debt burden have historically occurred during periods of high growth, rather than in periods of recession or anemic growth. If growth is the main way out of the crisis, and one does not want to openly consider expansionary fiscal policies, attention should at least focus on public support to industrial, innovation, and investment policies. Public investment banks, the European Investment Bank in the case of the eurozone, if not governments directly, may turn out to be decisive actors to eventually prompt a sustained and sustainable recovery.

References

- Alesina A. (2010) – *Fiscal adjustments: lessons from recent history*, paper prepared for the EU Ecofin meeting in Madrid, April 15th 2010.
- Alesina A., and Perotti R. (1995) – *Fiscal Expansions and Fiscal Adjustments in OECD Countries*, NBER Working Paper n. 5214.
- Alesina A., and Perotti R. (1997) – Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects, *IMF Staff Papers*, vol.44 (2): 210 – 248.
- Alesina A., and Ardagna S. (2010) – Large Changes in Fiscal Policy: Tax versus Spending, in J.R. Brown (ed.), *Tax Policy and the Economy*: 35 - 68.
- Alesina A., and Ardagna S. (2012) – *The Design of Fiscal Adjustments*, NBER Working Paper n. 18423.
- Alesina A., Favero C., and Giavazzi F. (2015) – The Output Effects of Fiscal Consolidation Plans, *Journal of International Economics*, vol.96 (supplement 1): S19 – S42.
- Ali Abbas A., Akitoby B., Andritzki J., Berger H., Komatsuzaki T., and Taylor J. (2013) – *Dealing with High Debt in a Era of Low Growth*, IMF Staff Discussion Note 13/07.
- Auerbach A., and Gorodnichenko Y. (2012) – Measuring the Output Responses to Fiscal Policy, *American Economic Journal: Economic Policy*, vol.4 (2): 1 – 27.
- Baker D., and Rosnick D. (2014) – *Stimulus and fiscal consolidation: The evidence and implications*, IMK Working Paper n.135.
- Barry F., and Devereux M.B. (2003) – Expansionary Fiscal Contraction: A Theoretical Explanation, *Journal of Macroeconomics*, vol.25 (1): 1 – 23.
- Batini N., Callegari G., and Melina G. (2012) – *Successful Austerity in the United States, Europe, and Japan*, IMF Working Paper n. 190.
- Baum A., Poplawski-Ribeiro M., and Weber A. (2012) – *Fiscal Multipliers and the State of the Economy*, IMF Working Paper n. 286.
- Bertola G., and Drazen A. (1990) – *Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity*, NBER Working Paper n. 3844.
- Botta A. (2013) – Fiscal Policy, Eurobonds, and Economic Recovery: Heterodox Policy Recipes Against Financial Instability and Sovereign Debt Crisis, *Journal of post-Keynesian Economics*, vol.35 (3): 417 – 441.
- Boyer R. (2012) - The four fallacies of contemporary austerity policies: the lost Keynesian

- legacy”, *Cambridge Journal of Economics*, vol.36 (1): 283- 312.
- De Grauwe P. (2011) – Managing a fragile eurozone, *CESifo Forum*, vol.12 (2), pp. 40 – 45.
- De Grauwe P., and Ji Y. (2013) – Self-fulfilling Crises in the Eurozone: An Empirical Test, *Journal of International Money and Finance*, vol.34 (April): 15 – 36.
- Dosi G., Napoletano M., Roventini A., and Treibich T. (2015) – The Short- and Long-run Damages of Fiscal Austerity: Keynes beyond Schumpeter, in: J.E. Stiglitz, and M. Guzman (eds.), *Contemporary issues in Macroeconomics. Lessons from the Crisis and Beyond*, Palgrave MacMillan: Basingstoke (UK) and New York (USA): 70 – 100.
- Dosi G., and Egidi M. (1991) – Substantive and Procedural Uncertainty – An exploration of Economic Behavior in Changing Environments, *Journal of Evolutionary Economics*, vol.1 (2): 145 – 168.
- Eichengreen B., and Panizza U. (2014) – *A Surplus of Ambition: Can Europe Rely on large Primary Surpluses to Solve its Debt Problem?*, NBER Working Paper n.20316.
- Foresti P., and Marani U. (2014) – Expansionary fiscal consolidations: Theoretical underpinnings and their implications for the eurozone, *Contributions to Political Economy*, vol.33 (1): 19 – 33.
- Giavazzi F., and Pagano M. (1990) – *Can Severe Fiscal Contractions Be Expansionary? Tales of two Small European Countries*, NBER Macroeconomic Annual, vol.5: 75 – 122.
- Giavazzi F., and Pagano M. (1996) – Non-Keynesian Effects of Fiscal Policy Changes: International Evidence and the Swedish Experience, *Swedish Economic Policy review*, vol.39 (3): 635 – 657.
- Gros D. (2012) – Can Austerity be Self-defeating? Credible Austerity Plans are Required, *Intereconomics*, vol.47 (3): 175 – 177.
- Guajardo J., D. Leigh, and Pescatori A. (2011) – *Expansionary Austerity: New Empirical Evidence*, IMF Working Paper n. 158.
- Kregel J. (2012) – *Six Lessons from the Euro Crisis*, Levy Institute Policy Note n. 2012/10.
- Lordon F. (1997) – Endogenous Structural Change and Crisis in a Multiple time-scales Growth Model, *Journal of Evolutionary Economics*, vol.7 (1): 1 – 21.
- Mehrling P. (2011) – *The New Lombard Street. How the Fed Became a Dealer of Last Resort*, Princeton: Princeton University Press.
- Ostry J.D., and Ghosh A.R. (2015) – *When is Repaying Public Debt Not of the Essence?*, post on the IMF blog available at <https://blog-imfdirect.imf.org/2015/06/02/when-is-repaying-public-debt-not-of-the-essence/>.
- Palley T. (2010) – *The Simple Macroeconomics of Fiscal Austerity*, Public Sector Debt and Deflation, IMK Working Paper n. 8/2010.
- Perotti R. (2012) – The “Austerity Myth”: Gain without Pain?, in A. Alesina, and F. Giavazzi (eds.), *Fiscal Policy after the Financial Crisis*, University of Chicago Press: London (UK) and New York (USA): 307 – 354.
- Qazizada W., and Stockhammer E. (2015) – Government spending multipliers in contractions and expansions, *International Review of Applied Economics*, vol.29 (2): 238 – 258.
- Radzicki M.J., and Sterman J.D. (1994) – Evolutionary Economics and System Dynamics, in R.W. England (ed.), *Evolutionary Concepts in Contemporary Economics*, The University of Michigan Press: Ann Arbor: 61 – 93.
- Reinhart C.M., and Rogoff K.S. (2010) – Growth in a Time of Debt, *American Economic Review Paper and Proceedings*, vol.100 (May): 573 – 578.

- Sutherland A. (1997) – Fiscal Crises and Aggregate Demand: Can High Public Debt Reverse the Effect of Fiscal Policy?, *Journal of Public Economics*, vol.65 (2): 147 – 162.
- Taylor L. (1991) – *Income Distribution, Inflation and Growth: Lectures on Structuralist Macroeconomic Theory*, MIT Press: Cambridge (USA) and London (UK).
- Taylor L. (2004) – *Reconstructing Macroeconomics*, Cambridge, Massachusetts (USA) and London: Harvard University Press.
- Taylor L. (2012) – Growth, Cycles, Asset Prices and Finance, *Metroeconomica*, vol.63 (1): 40 – 63.
- Warmendinger T., Checherita-Westphal C., and Hernandez de Cos P. (2015) – *Fiscal Multipliers and Beyond*, ECB Occasional Paper Series no.162/June 2015.

Figures

Figure 1 – Austerity-led ‘endless’ economic contraction and explosive deficit-to-GDP in an *unstable* short-run setting.

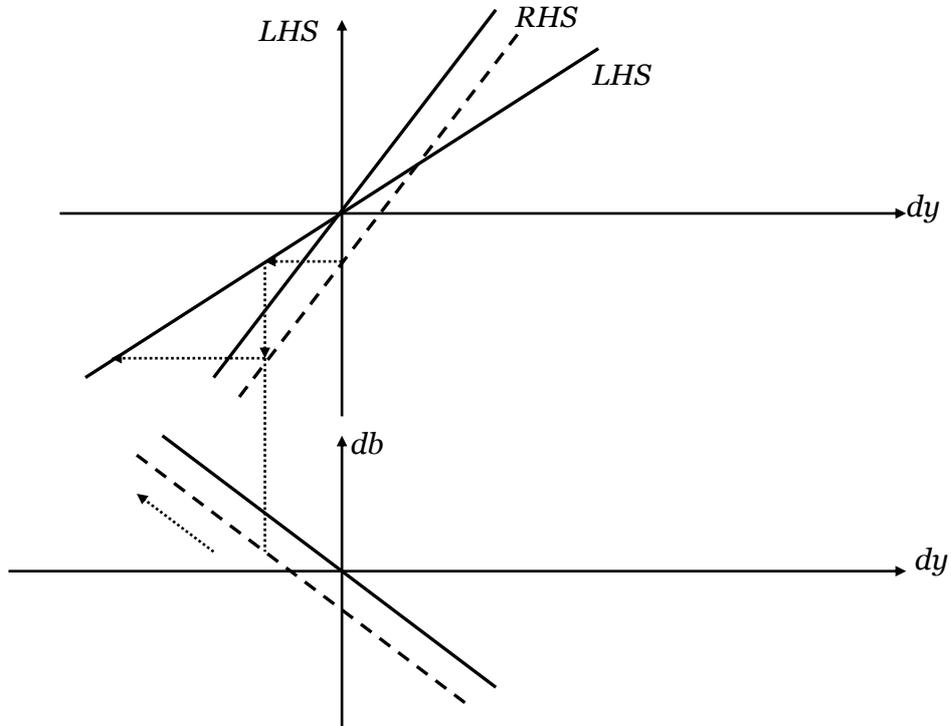


Figure 2 – Multiple equilibria in the $(y^e-\lambda)$ space with self-stabilizing expectations

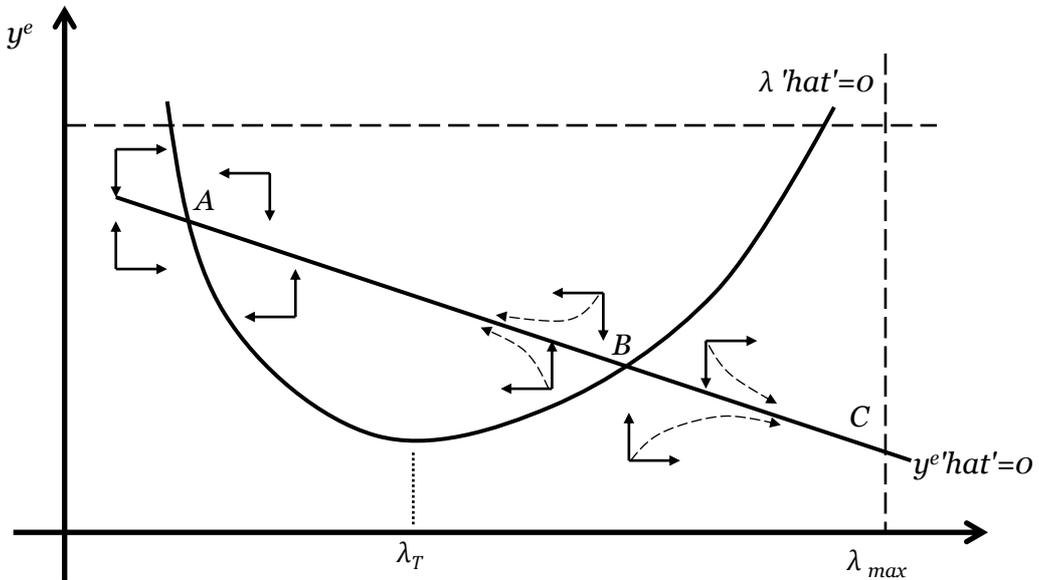


Figure 3 – Multiple equilibria in the $(y^e - \lambda)$ space with unstable expectations

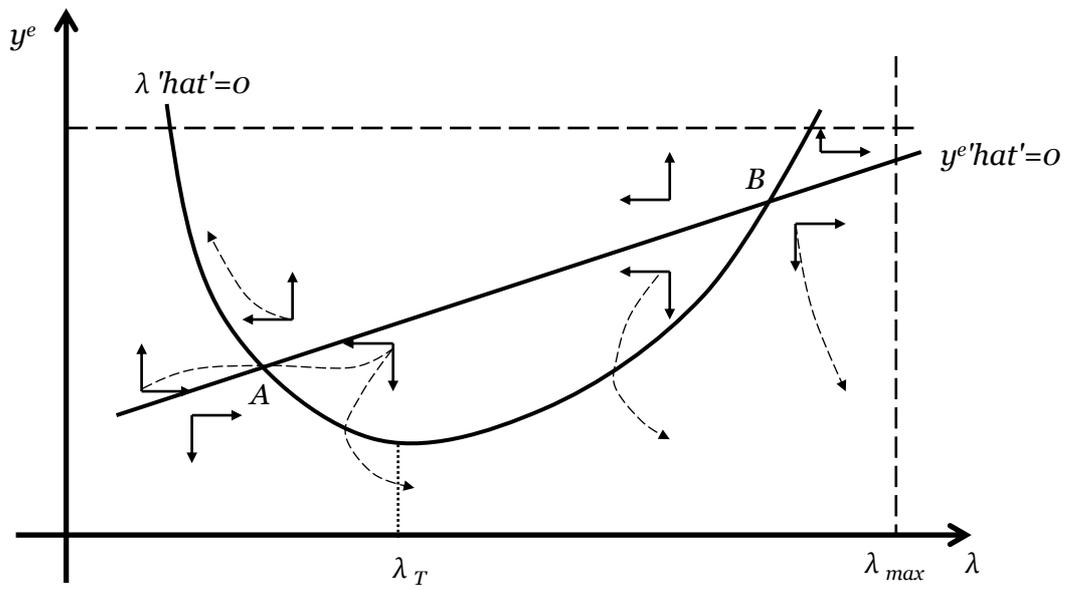


Figure 4 – Long-run outcomes of austerity-led short-run recessions in a *stable* dynamic scenario

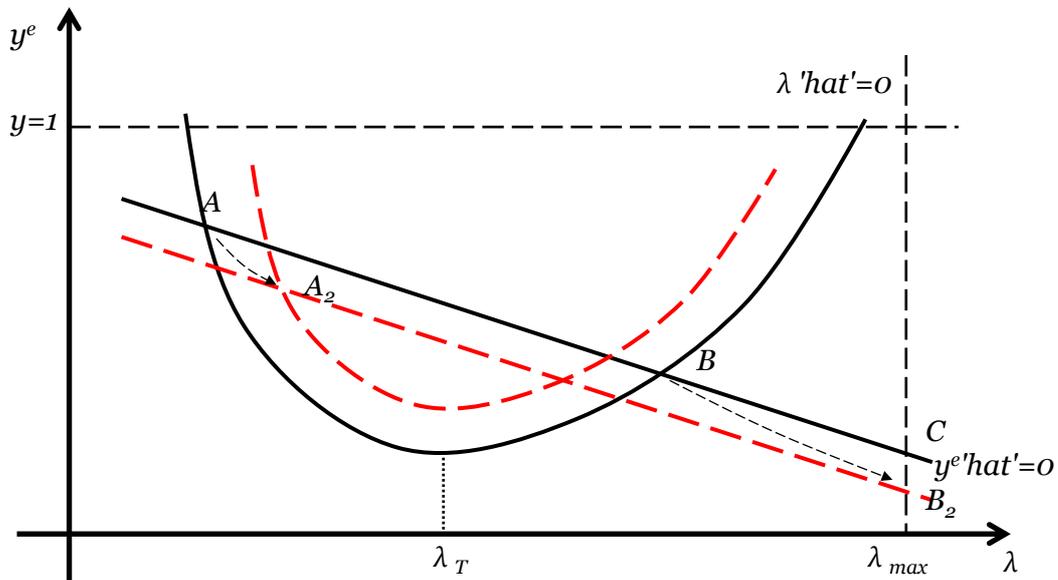


Figure 5 – Long-run outcomes of austerity-led short-run recession in an *unstable* dynamic scenario

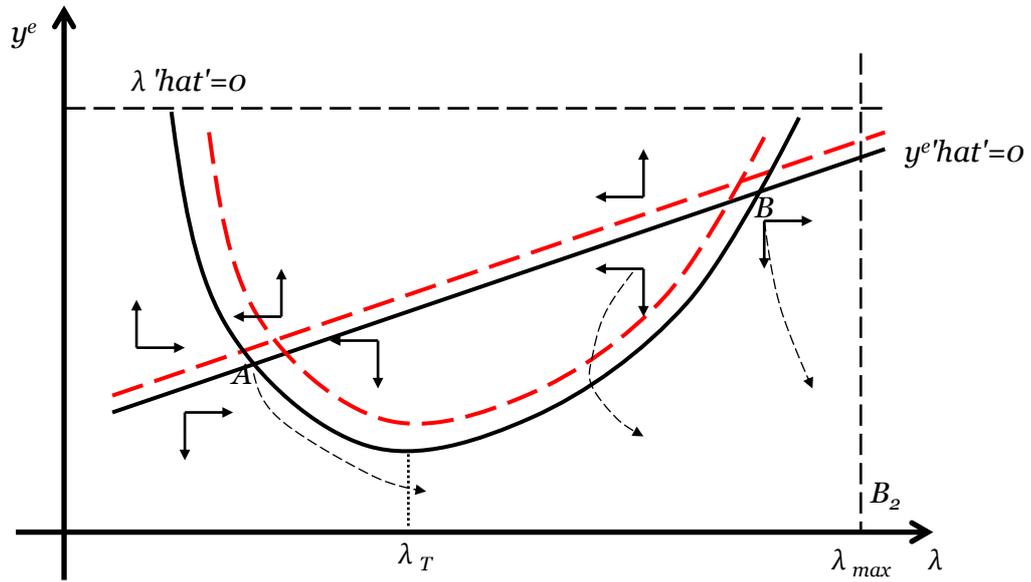


Figure 6 – Stabilizing macroeconomic effects of monetary sovereignty

